User Guide
ZETA 8

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BRUNING

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WARNING

This equipment generates and can radiate radio frequency energy and if not installed and used in accordance with the user guide may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the customer at his own expense will be required to take whatever measures may be required to correct the interference.

CAUTION--To assure compliance with FCC specifications, the customer is required to use this equipment with its factory-supplied, shielded cable or equivalent. Failure to comply may result in violation of FCC rules for which the customer would be responsible.

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PREFACE

PLOTTER FEATURES

The desk-top ZETA 8 is an eight-pen, high-speed drum plotter that provides high-resolution, multicolored plots. It supports most major computer communication protocols and can be operated on-line, either directly or remotely (via a modem), or off-line with a controller. Using existing software, the ZETA 8 creates a wide spectrum of hard copy graphics that include:

* Business presentation reports, graphs and charts
* Overhead transparencies
* Printed circuit board layouts
* Topographical maps
* Subdivision layouts
* Process flow charts
* Engineering diagrams
* Scientific data waveforms
* Program/project management schedules

The ZETA pen cartridge carries eight pens simultaneously allowing for quick pen changes. The ZETA 8 works with nylon tip, ballpoint, liquid roller, and liquid ink pens on a number of media surfaces, giving you wide application possibilities.

A large number of functions are accessible through the control panel, and indicator lights and a beeper alert you to operating conditions. A number of functions can also be controlled through a terminal. Additionally, the unique Look Ahead Vector Analysis (LAVA) feature allows your plotter to operate at extremely high speeds.

The ZETA 8's firmware character generator produces approximately 200 different characters, including Greek letters and mathematical symbols. Characters may be plotted at any size, angle, slant, and width-to-height aspect ratio, and may be shaded.

The dot/dash mode produces lines and curves with dashes and spaces in user-defined patterns. This provides an unlimited variety of graphic presentations. The arc generator draws circles and arcs of any radius in either direction.

The ZETA 8 has an RS-232-C interface with an optional IEEE-488 interface, allowing connection to a wide range of host computers and intelligent devices.

HOW TO USE THIS GUIDE

The ZETA 8 User Guide is a reference manual for the operator who is already familiar with a ZETA plotter. First-time users should refer to the publication entitled "Getting to Know Your ZETA 8 Plotter." This small booklet gives a step-by-step explanation of how to set up and prepare the plotter for plotting. The booklet also leads you through a demonstration plot to help you gain familiarity with plotter operation.

This User Guide can be informally divided into three main parts:

1. SET-UP (Section 1) contains specific information concerning cabling, Option Switches, pen and media loading, plotter care, and software installation.

2. PLOTTER FEATURES AND OPERATION (Sections 2-6) explains the indicators and pushbuttons on the control panel. You will also find information on all of the plotter features which can be controlled through the panel (Parameter Mode Select (PMS), Set Size, etc.). Also included in this part is a description of the Terminal Monitor System (TMS). This system allows you to control certain plot characteristics through a terminal. In addition this part discusses the character fonts built into the plotter and the ROM-packs and software you can purchase from our factory to enhance your plotter's capabilities.

3. TROUBLESHOOTING (Section 7) contains a troubleshooting guide and plotter specifications. You will also find repacking instructions and the telephone number of our Customer Support group.

This guide is primarily concerned with plotter hardware. A brief overview of the software available is given in Section 6 of this guide. Complete software and firmware information is contained in the ZETA series of software guides.

In addition to the User Guide and the "Getting to Know Your ZETA 8 Plotter" booklet, you will receive a "Pen and Media Guide" with your ZETA plotter. This short manual will help you select successful pen and media combinations for your particular applications. The guide also describes the plotter supplies you can purchase from our factory.

UNPACKING

All ZETA plotters are carefully inspected, both mechanically and electrically, before shipment. When unpacking the plotter, inspect it for physical shipping damage. Save all shipping materials in the event the plotter must be transported. If there is any damage refer to the warranty.

Figure 1-1 illustrates the ZETA 8 plotter and its parts.

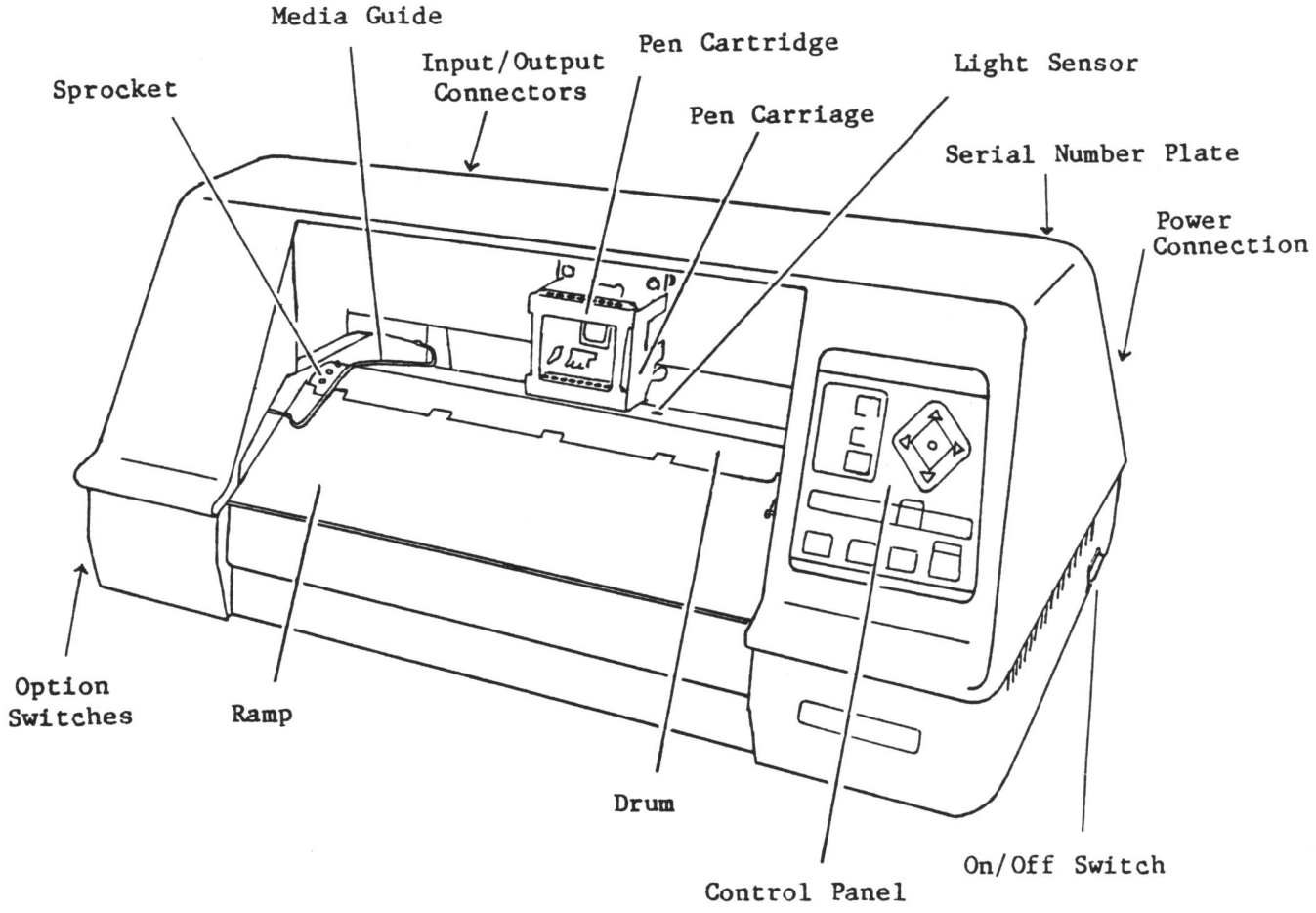


Figure 1-1
ZETA 8 Plotter

POWER CONNECTION

Connect the power cord to the plotter and a grounded AC power source (see Figure 1-2). For a detailed list of power requirements, refer to Section 7, Specifications.

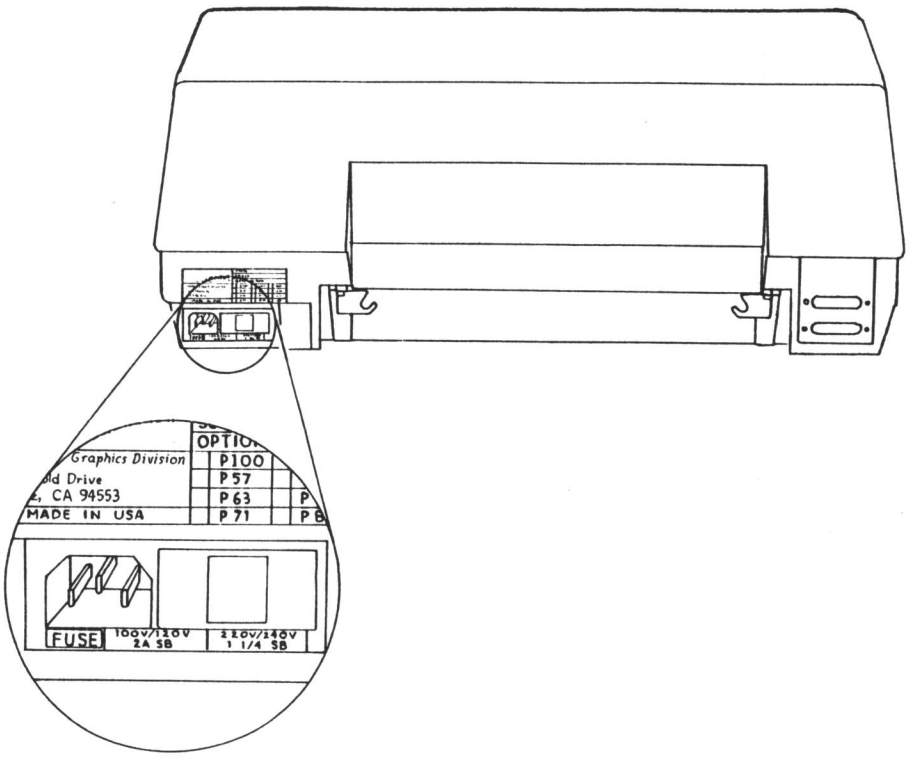


Figure 1-2
Power Connection

Depending on the options you purchase, your plotter will have provisions for IEEE-488 and/or RS-232-C cables.

* RS-232-C - Connect the plotter to the terminal via the port labeled "TO TERMINAL J103." Connect the plotter to the host computer via the port labeled "TO MODEM J102" (see Figures 1-3 and 1-4).

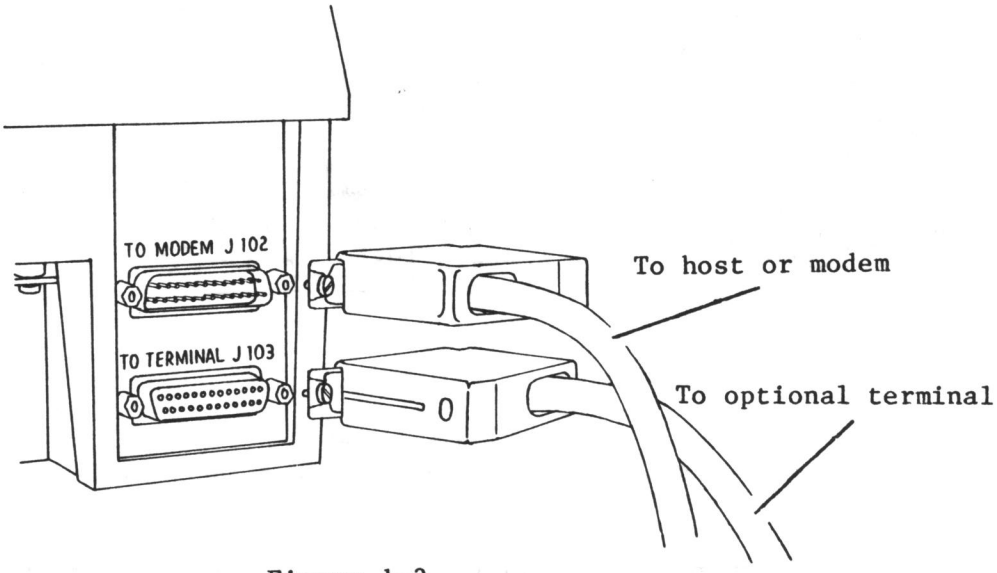


Figure 1-3
RS-232-C Cable Connection

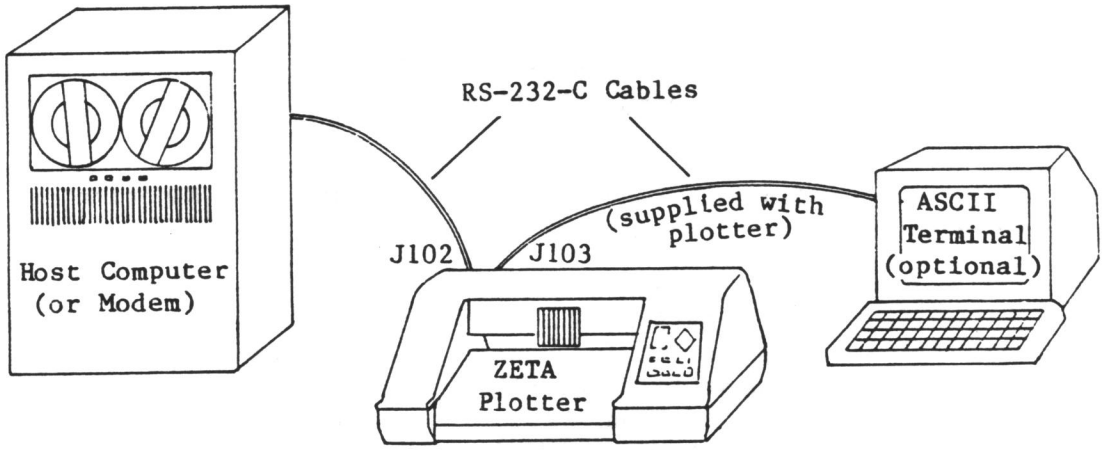


Figure 1-4
Typical RS-232-C Cable Set-up

With the RS-232-C ports, the ZETA plotter will also run off a personal computer. Connect the plotter to the PC with a female-female RS-232-C cable (part no. 004-800773). Use the plotter port labeled "TO MODEM J102" (see Figure 1-5). To connect an ASCII terminal to the plotter, use an RS-232-C cable attached to the "TO TERMINAL J103" port.

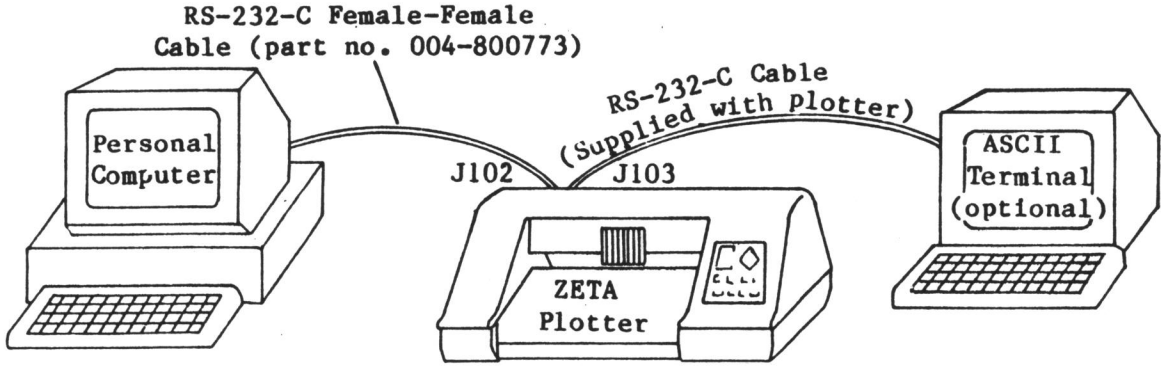


Figure 1-5
Cabling Between the Plotter and a PC

The following table defines the pin functions of the RS-232-C ports. This information will be helpful if you need to adapt your cable to the ZETA interface. The ZETA interface is, however, in full compliance with the EIA standard.

TABLE 1-1
RS-232-C PIN FUNCTIONS

Pin #	Modem Port Function	Terminal Port Function
1	Chassis Ground	Same
2	Transmit (XMIT)	Receive (RCV)
3	Receive (RCV)	Transmit (XMIT)
4	Request to Send (RTS)	Same
5	Clear to Send (CTS)	Same
6	Data Set Ready (DSR)	Same
7	Signal Ground	Same
8	Data Carrier Detect (DCD)	Same
9-19	Not Used	Same
20	Data Terminal Ready (DTR)	Same
21-25	Not Used	Same

* IEEE-488 - Connect the plotter to the IEEE-488 bus via the port labeled "TO IEEE-488 J104" (see Figures 1-6 and 1-7).

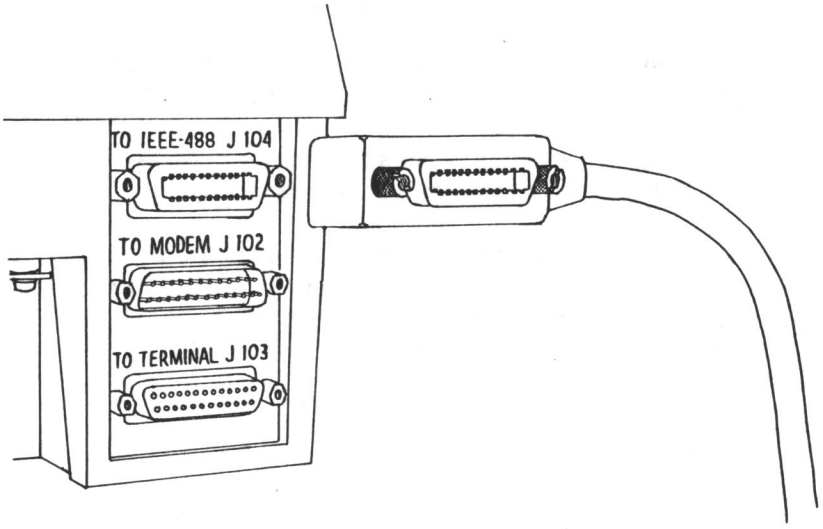


Figure 1-6
IEEE-488 Cable Connection

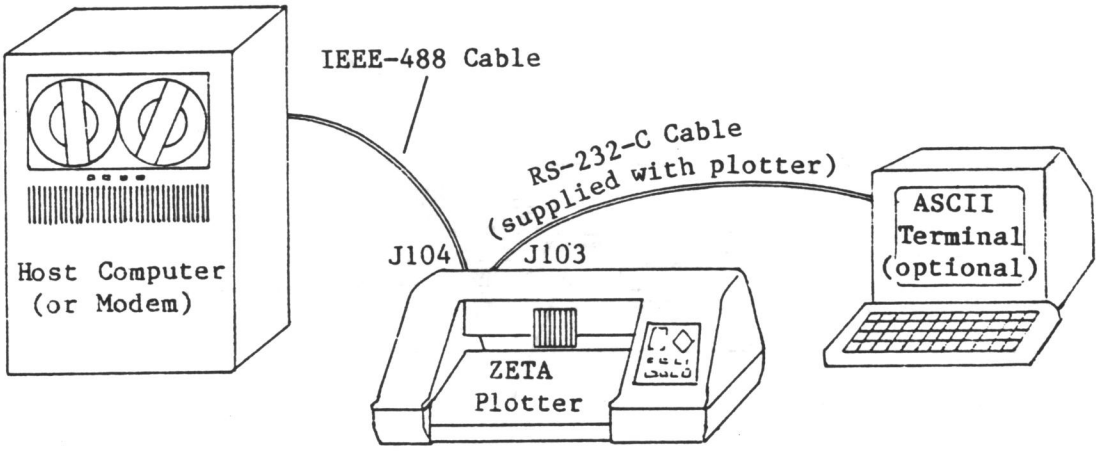


Figure 1-7
Typical IEEE-488 Cable Set-up

OPTION SWITCHES

Option Switches are provided to allow you full control over the operation of your ZETA plotter. They provide a means of mode selection and allow you to take full advantage of the capabilities designed into the plotter.

The majority of these switches will be set initially during installation and seldom altered thereafter. However, you may wish to change the Option Switch settings if you want to change your operating mode to run different plotting software, interface with a secondary host computer or system, or use your plotter in one of the line printer emulation modes.

A magnetically attached door on the left side of the plotter provides access to the Option Switches. To open the door, pull it downward and out. The Option Switches include: three banks of eight DIP (dual in-line package) switches (SW01, SW02, and SW03), and two rotary dials (SW04A and SW04B).

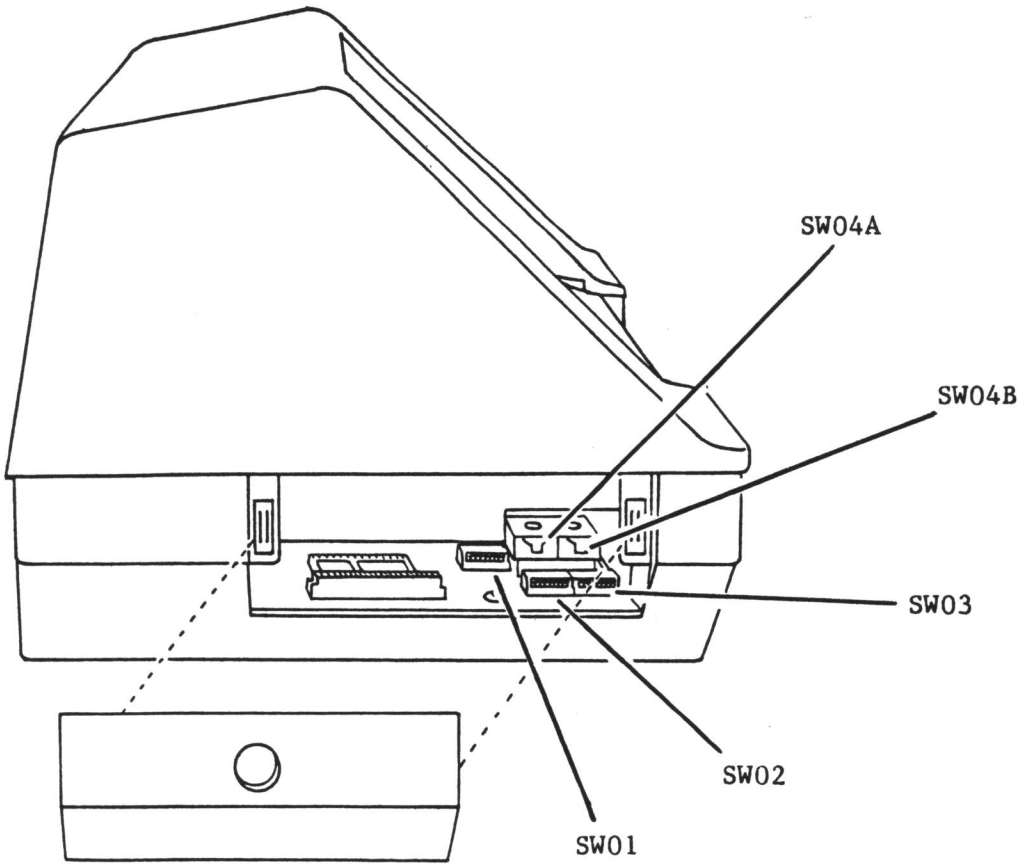


Figure 1-8
Option Switch Location

SW01, SW04A and SW04B have well-defined functions. SW01 is used solely to set the operating mode (interface and graphics language) of the plotter. SW04A and SW04B are ten-position rotary dials with their set positions numerically displayed in their viewing windows. The rotary dials have one function each: SW04A sets pen speed and SW04B sets pen pressure. (Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

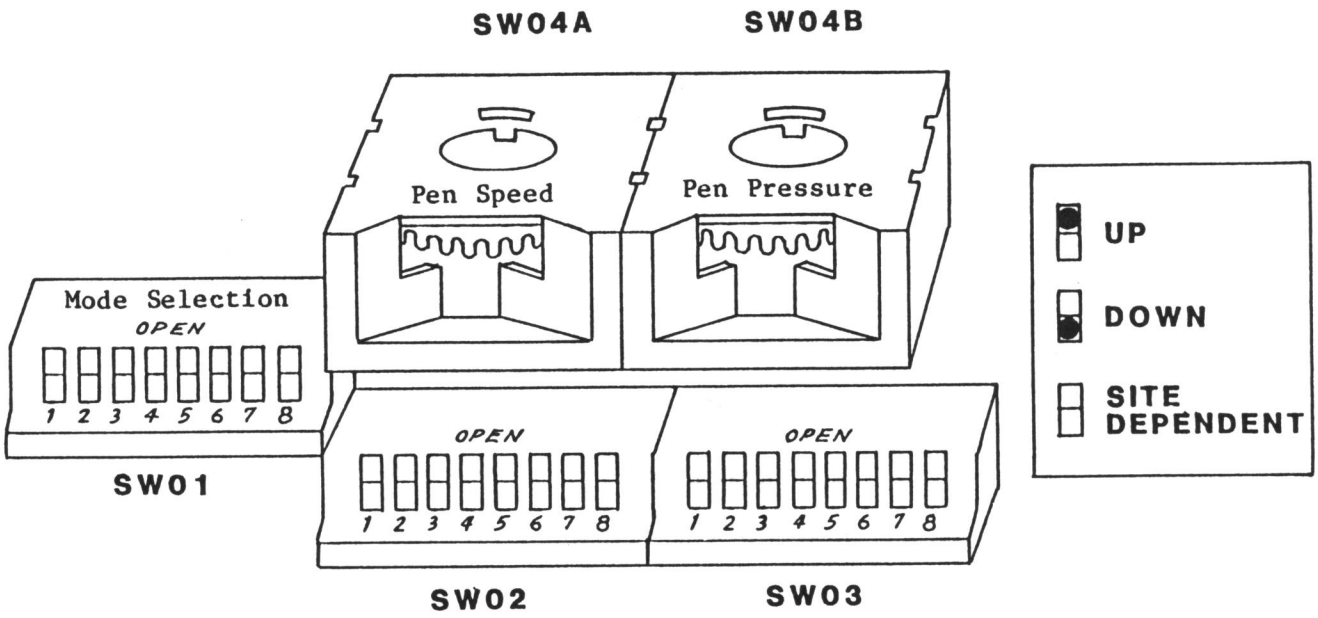


Figure 1-9
Option Switch Functions

Option Switches SW02 and SW03 have functions that vary depending on the operating mode selected by SW01, and on the settings of other SW02 and SW03 Option Switches.

The following instructions are critical to Option Switch settings:

* Be sure to set single switches listed as "Not Used" in the up position.

* In some cases you will be given a choice between functions for the same switch or switches. Your selection will be based on how you have set a previous switch.

* After setting the Option Switches, press the CLEAR Touch Control to register the switch positions. SW04B is read at each pen down, so you do not need to press CLEAR to register its setting.

The ZETA 8 plotter will operate in eight different modes, however, only the modes you purchase will be operational in your plotter. Each mode is characterized by a graphics or plotting language and a communications interface. The following table lists the modes which can be implemented on this plotter. The specific switch settings for each mode are given in Section 8. A glossary of terms is located after the switch settings.

TABLE 1-2
ZETA 8 MODES

Mode No.	Description*	Page No.
0	GML - RS-232-C	8-2
1	GML - IEEE-488	8-5
2	Not Implemented	8-8
3	Printer - RS-232-C	8-9
4	Printer - IEEE-488	8-12
5	Not Implemented	8-15
6	HPGL - RS-232-C	8-16
7	HPGL - IEEE-488	8-19
8	TPE - RS-232-C	8-22
9	Not Implemented	8-25
10	CCP-960 - RS-232-C	8-26

* GML: (Graphics Machine Language) the machine language which drives a ZETA plotter. You should select a GML mode if you are using FPS (Fundamental Plotting Subroutines) software or any other software which produces GML.
HPGL: Hewlett-Packard Graphics Language
TPE: Tektronix Plotter Emulator
CCP: CalComp

PEN CARTRIDGES

The ZETA 8 plotter will accommodate two different pen cartridges:

1. the standard eight slot for liquid roller, nylon tip, and ballpoint pens, and

2. the four slot for refillable and disposable liquid ink pens (not supplied with plotter).

PEN LOADING PROCEDURE

1. Slide the pen carriage to the middle of the plotter either by hand if the plotter is off or with the Directional Arrows if the plotter is on.

2. Pull forward on the removable pen cartridge in the pen carriage (see Figure 1-10) and lift it out. This procedure is the same for the four slot pen cartridge.

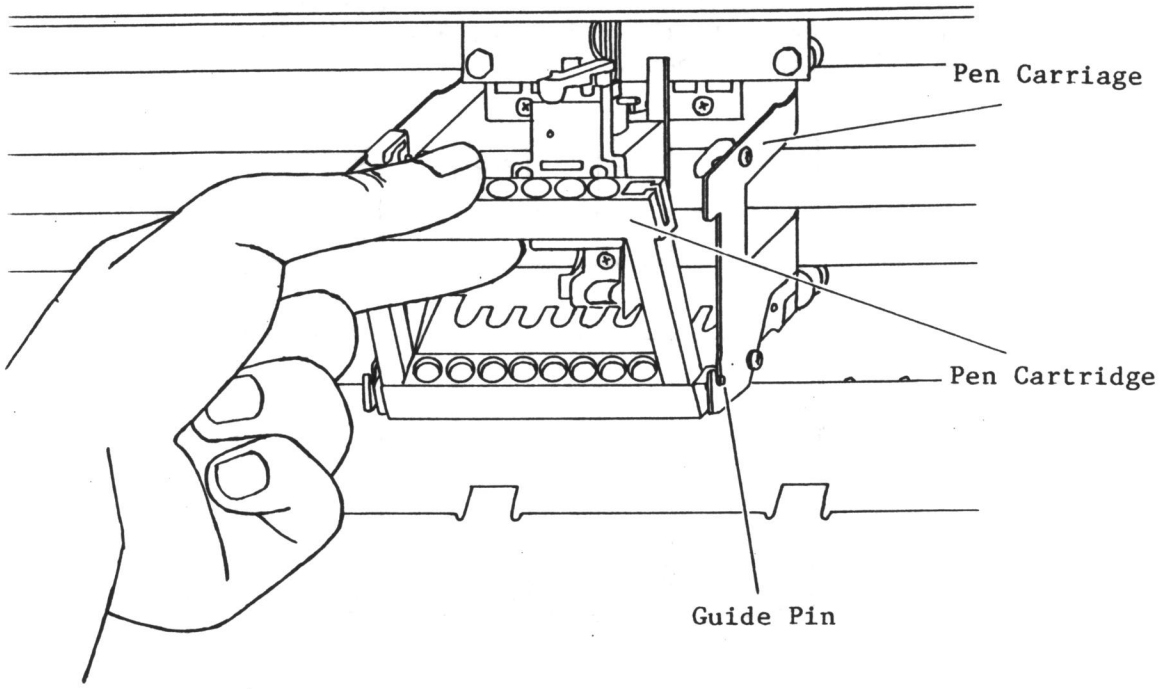


Figure 1-10
Pen Cartridge Removal

3. Gently insert the pens, tip down, into the pen cartridge. Refer to your software application manual to determine the default color order for your software package.

4. Replace the pen cartridge (refer again to Figure 1-10). Place the guide pins in their slots and then snap the top back into place. The regular pen cartridge is reversible, so it doesn't matter which side is facing out.

   CAUTION: Make sure the cartridge is snapped back in place before you press any of the Touch Controls or attempt to plot.

Liquid Ink Notes:

* Always press the LIQUID INK touch control if you intend to use either the refillable or disposable liquid ink pens. This control will automatically adjust the pressure, speed, and pen delay time for the liquid ink pens. More importantly, this control alerts the actuator (i.e., the arm which presses the pens onto the media) that there are four pens rather than eight. Pen mapping occurs automatically, so that only four physical pens (1, 3, 5, and 7,) are used. No software modifications are required.

* If you are installing the liquid ink pen cartridge, make sure that the slots are offset to the left (see Figure 1-11). Otherwise, the actuator will miss the pens.

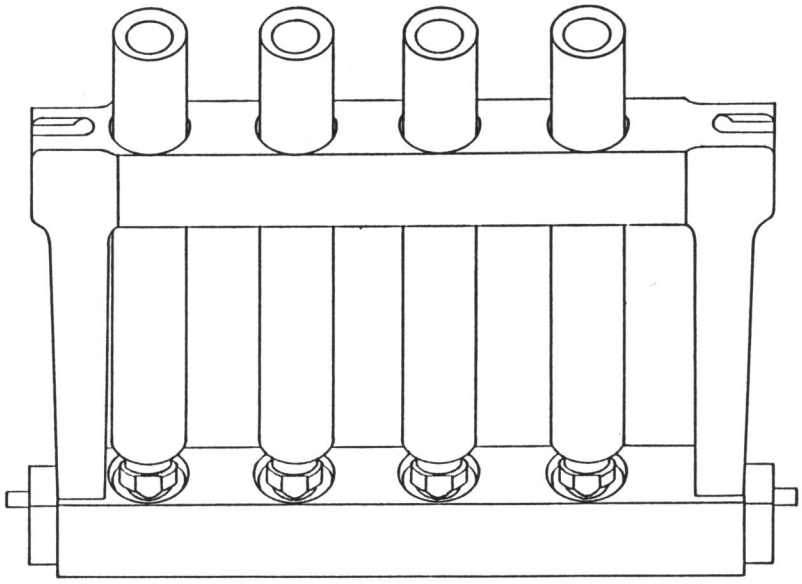


Figure 1-11
Correct Orientation of the Liquid Ink Pen Cartridge

ROLL MEDIA LOADING

1. Push the media roll adapters into the ends of the media roll. The hubs should be flush with the roll ends. Tighten the knurled screws by turning them clockwise (see Figure 1-12). If you have trouble securing the adapter, hold the hub still as you are turning the screw. The adapter should fit snugly. Overtightening can cause the media core to flange out.

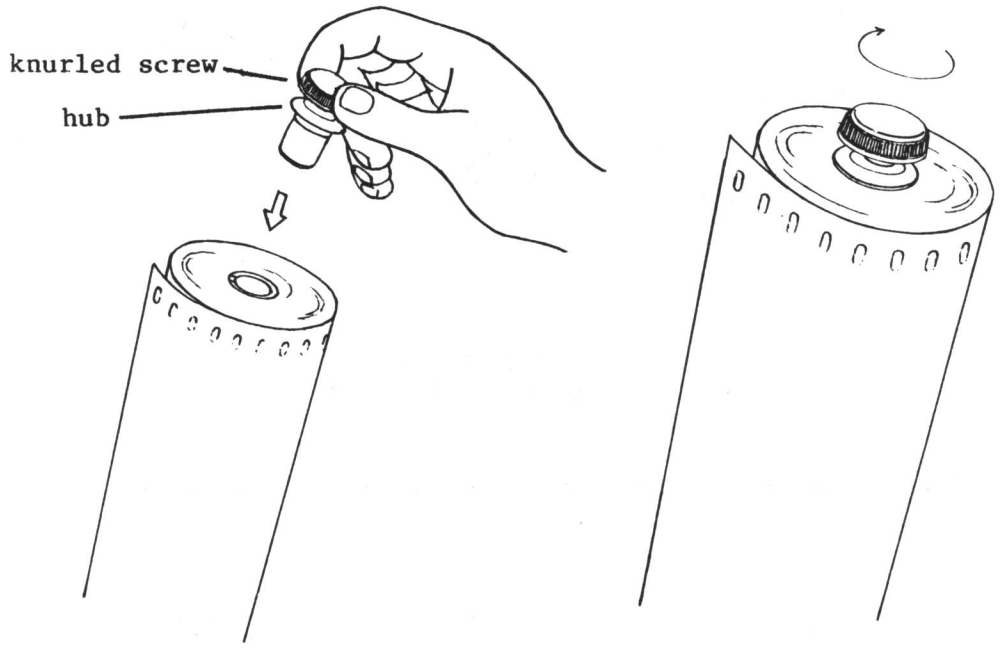


Figure 1-12
Media Roll Adapter Insertion

WARNING: THE MOVING PARTS OF THE PLOTTER CAN BE HAZARDOUS. TO PREVENT INJURY, USE CAUTION WHEN OPERATING THE PLOTTER. IN PARTICULAR, KEEP HANDS, HAIR, NECKTIES, JEWELRY, AND LOOSE CLOTHING CLEAR OF PLOTTER OPERATION.

2. Move the pen carriage to the center of the pen rail either by hand if the plotter is off or automatically with the Directional Arrows.

3. Set the roll with attached adapters in the media holders on the back of the plotter (see Figure 1-13). The holders should be turned outward and the media should be feeding over the top of the roll.

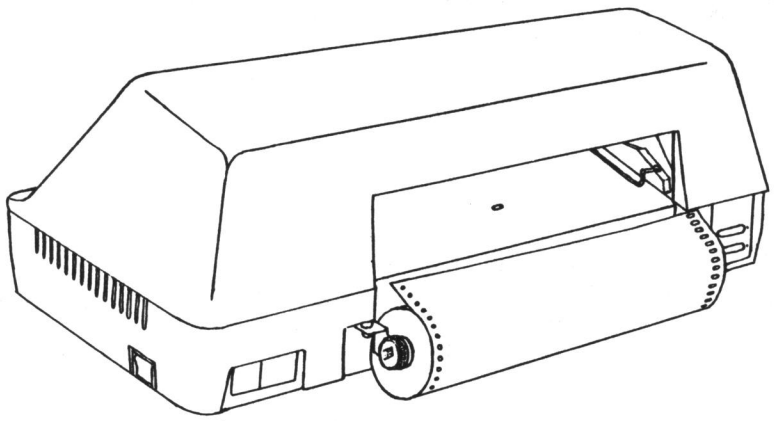


Figure 1-13
Roll Media in Holders

4. Fold the corners of the media as shown in Figure 1-14.

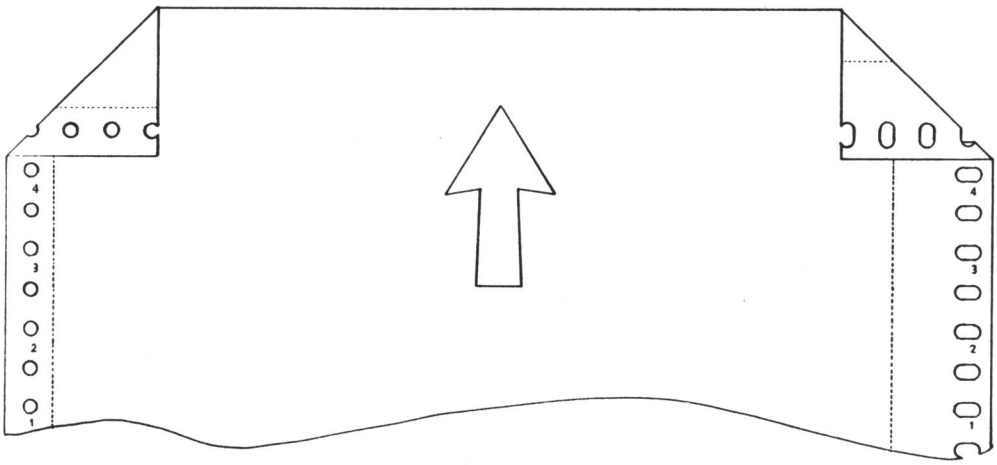


Figure 1-14
Media with Folded Corners

5. Feed the media through the back under the media guides (see Figure 1-15).

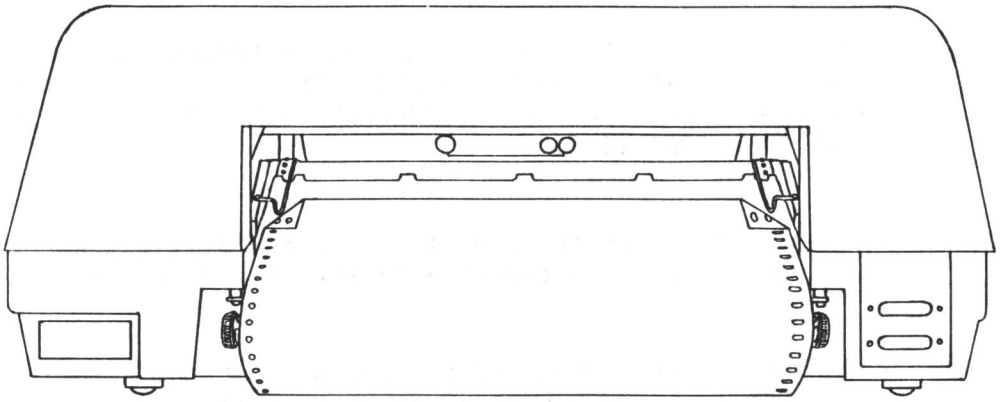


Figure 1-15
Media Under Media Guides

6. Align the media holes with the plotter sprockets so that the numbers in the margins of the media correspond (see Figure 1-16).

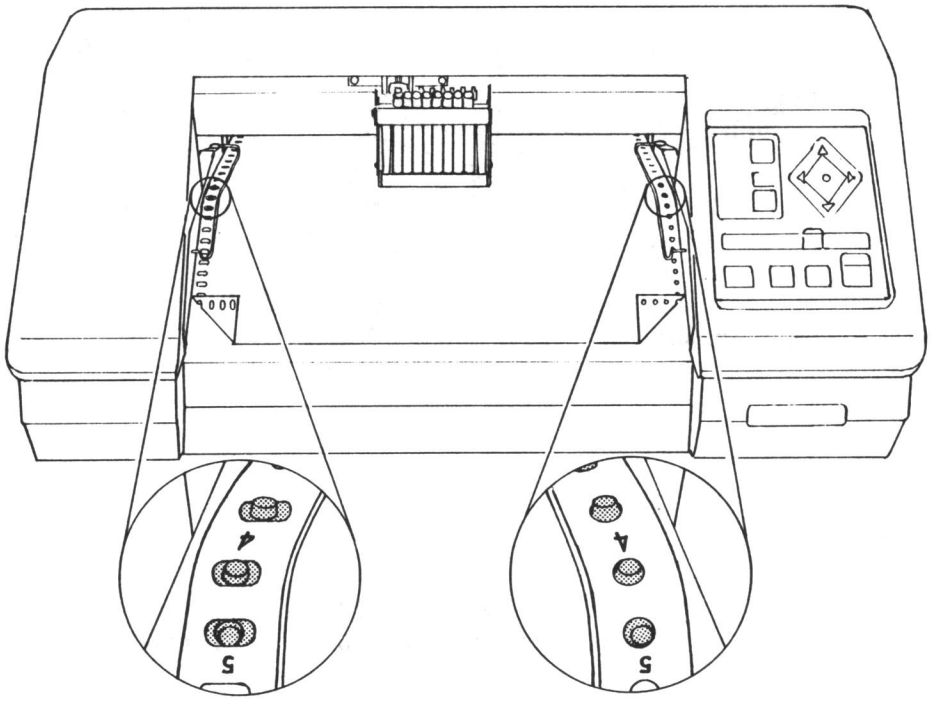


Figure 1-16
Corresponding Numbers on Media

7. Move the media forward using the Directional Arrows.

FANFOLD MEDIA LOADING

WARNING: THE MOVING PARTS OF THE PLOTTER CAN BE HAZARDOUS. TO PREVENT INJURY, USE CAUTION WHEN OPERATING THE PLOTTER. IN PARTICULAR, KEEP HANDS, HAIR, NECKTIES, JEWELRY, AND LOOSE CLOTHING CLEAR OF PLOTTER OPERATION.

1. Move the pen carriage to the center of the pen rail either by hand if the plotter is off or automatically with the Directional Arrows.

2. Set the fanfold paper behind the plotter so that the circular holes are next to the power port and the numbers on the paper are visible (see Figure 1-17).

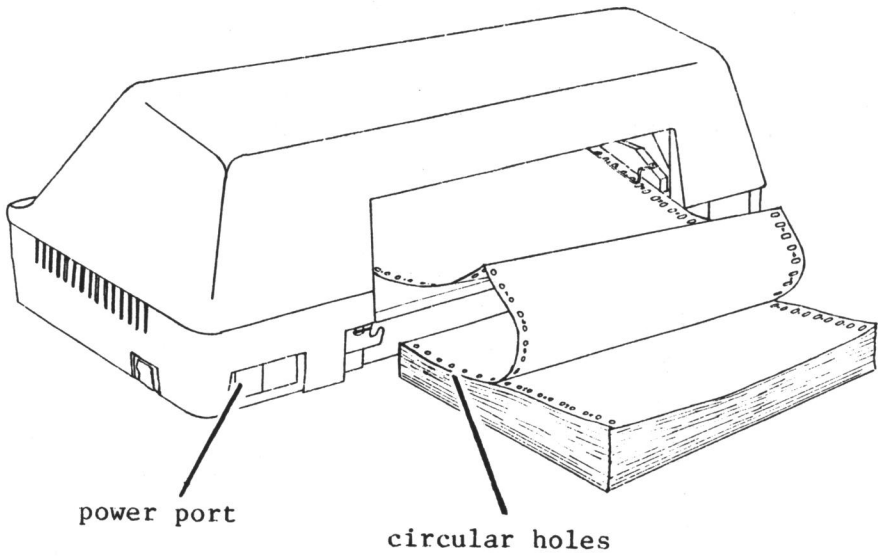


Figure 1-17
Fanfold Media Stacked Behind Plotter

3. Fold the corners of the media as shown in Figure 1-18.

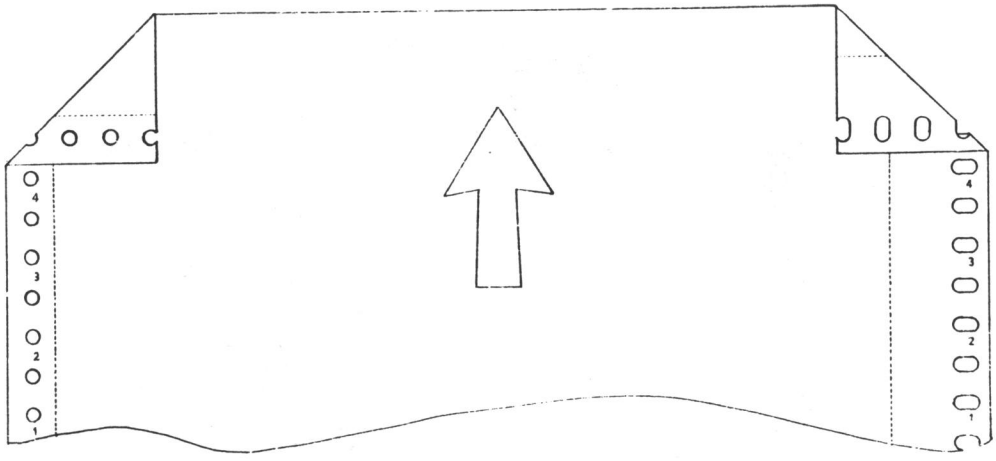


Figure 1-18
Media with Folded Corners

4. Feed the media through the back under the media guides (see Figure 1-19).

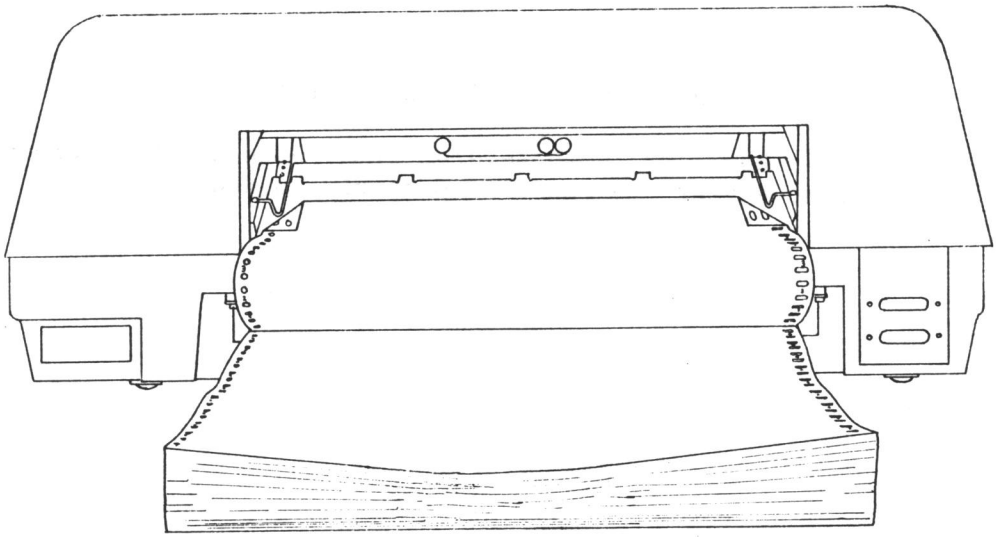


Figure 1-19
Media Under Media Guides

5. Align the media holes with the plotter sprockets so that the numbers in the margins of the media correspond (see Figure 1-20).

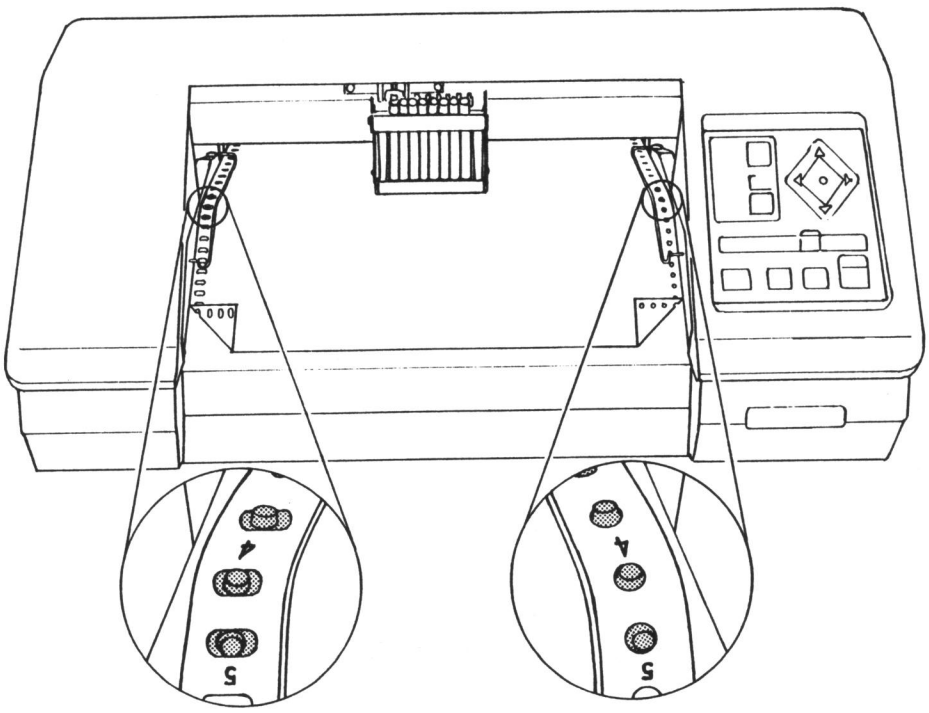


Figure 1-20
Corresponding Numbers on Media

6. Move the media forward using the Directional Arrows.

7. Move the media back and forth several times with the Directional Arrows to ensure that the media is properly loaded.

PLOTTER CARE

* When your plotter is not in operation, cover it with the dust cover.

* Use a damp cloth to wipe off painted surfaces, and a no-rinse glass cleaner to clean all other plotter surfaces.

* Wipe both the top and bottom of the pen rail (see Figure 1-21) with a soft cloth about once a month.

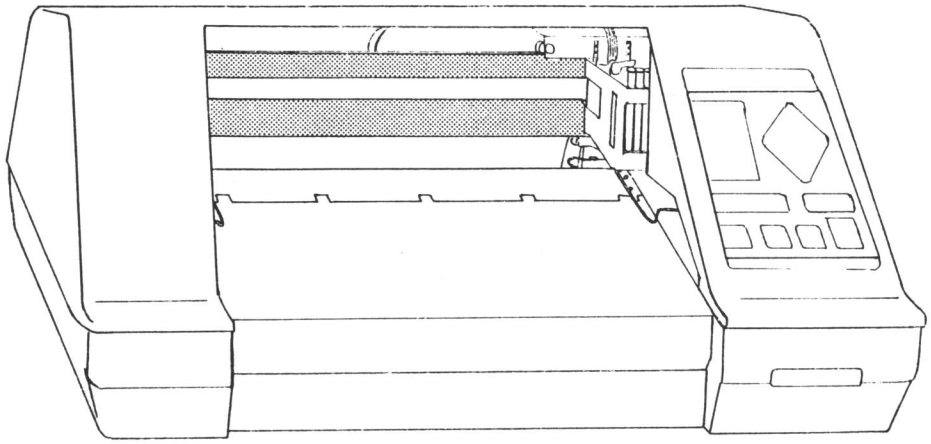


Figure 1-21
Pen Rail (highlighted)

* Clean your pens and pen cartridge as directed in the Pen and Media Guide.

OVERVIEW

The control panel allows you to:

* receive plotter status information (error codes, limit overrun, power on, etc.)
* select certain plotter features (PMS, Set Size, etc.)
* control plotter operation (pen and media movement)

This section describes the meanings of the Indicator Lights and the functions of the Touch Controls (refer to Figure 2-1 as you study the listings on the following pages).

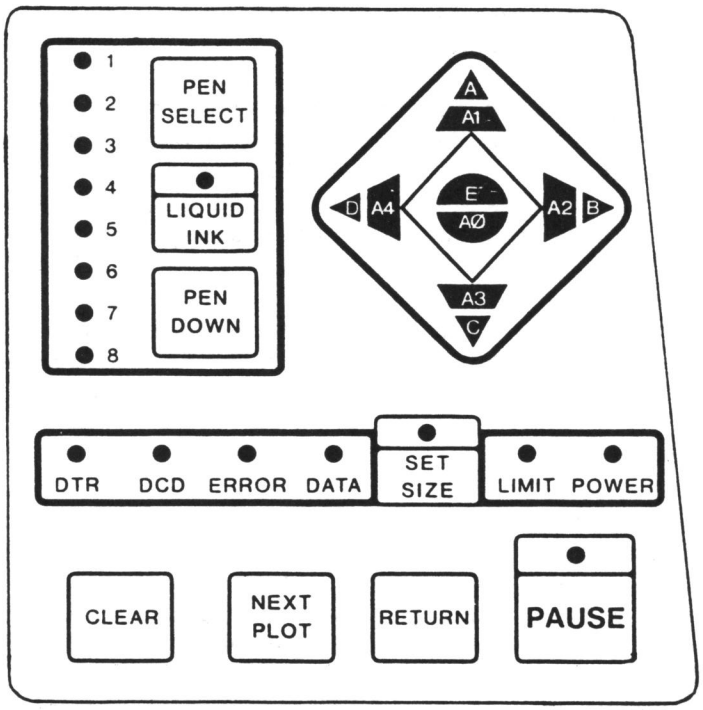


Figure 2-1
Control Panel

INDICATOR LIGHTS (LEDs)

DATA — Plotter buffer contains data.

DCD (Data Carrier Detect)
Plotter communicating with a host computer (only with RS-232-C cabling and no XON/XOFF).

DTR (Data Terminal Ready)
Plotter buffer ready to accept more data (only with RS-232-C cabling and no XON/XOFF).

ERROR — Communication interface error, plotter malfunction, or garbled transmission received in Error Correct mode. The pen lights may also flash an error code number. Refer to Section 7, Error Codes and Recovery, or Section 8, Error Correct.

LIMIT — A pen has been commanded to exceed a margin limit or the light sensor has detected absence of media.

LIQUID INK — Liquid Ink function selected. The speed, pressure, and pen delay time are set automatically. The plotter also maps the pens so that you don't have to modify any software which calls more than four pens.

PAUSE — Plotting suspended. When blinking, this light indicates operation of the Parameter Mode Select. Refer to Section 3, Parameter Mode Select. If the PAUSE and SET SIZE lights are flashing simultaneously, you must digitize a point. Refer to the SET SIZE indicator light description for more information.

PEN SELECT Number Indicators
A specific pen is in use. These indicators also display error code numbers. For Parameter Mode Select operation the indicator lights indicate the number of your PMS function.

POWER — Power on.

SET SIZE — Set Size function is on when the light is blinking. Refer to Section 4, Set Size. If the SET SIZE and PAUSE lights flash simultaneously and your plotter is set to either of the HPGL modes (6 or 7), the plotter is signaling you to digitize a point. Some software packages generate plot files which require you to digitize a certain point before plotting. Consult your software package to find out which point you must digitize. Use the directional arrows to move the selected pen to the appropriate position. Press the RETURN Touch Control to enter the coordinates of this point with a pen up status. Press the RETURN and PEN DOWN Touch Controls simultaneously to enter the coordinates with a pen down status.

TOUCH CONTROLS

CLEAR — Initializes the plotter as if it had been turned off and then on again. Plotting functions not controlled by the Option Switch settings, like TMS and PMS, will be cancelled. If pressed while plotting, the results will vary depending on the communications interface and graphics language. In all cases, the contents of the input buffer are cleared. Using CLEAR is not recommended for aborting plots (see NEXT PLOT).

Directional Arrows and Center Dot — Moves the pens or media in the indicated direction at a slow speed [0.25 inches per second (ips)], or at a fast speed (10 ips) when a Directional Arrow and the Center Dot are pressed simultaneously. With these controls you can reposition your plot by moving the pen carriage to a different starting point or origin. The numbers and letters on the arrows are used in Set Size operation.

LIQUID INK — Sets operating parameters for liquid ink usage. Speed, acceleration, pen pressure, and Pen Delay Time (PDT) are adjusted and the corresponding Option Switches overridden. LIQUID INK must be used in conjunction with a four-slot pen cartridge.

NEXT PLOT — This Touch Control works in GML modes only. If pressed after PAUSE, NEXT PLOT aborts the plot in progress and initiates the next plot in your file. The media position for your next plot is dependent on how you have set your automatic repositioning Option Switches. Refer to Section 8, Option Switch Settings.

PAUSE — Allows you to suspend plotting in order to examine a plot, change a pen, or prime a pen. Pressing PAUSE will not affect communication with your host and the front panel controls will remain enabled. To resume plotting press PAUSE again. PAUSE is also used as part of the Parameter Mode Select operation. See also: RETURN.

PEN DOWN — Lowers selected pen. The pen will be held against the drum until you release the Touch Control. PEN DOWN can also be used for digitizing. Refer to the SET SIZE indicator light description for more information.

PEN SELECT — Advances your pen selection to the next pen each time it is pressed. Pressing the Center Dot in conjunction with PEN SELECT will cause the pens to be selected in the reverse order. There are eight pen choices for most applications unless LIQUID INK is pressed in which case there are four pen choices. PEN SELECT is also used to select digits in Parameter Mode Selection operation.

RETURN — Allows you to stop mid-plot, move a plot forward for inspection, and then return it to its original position to resume plotting. If pressed at the end of a plot RETURN gives you the initial origin of that plot. Pressing RETURN and the Center Dot simultaneously allows you set scaling factors for grid paper or pre-printed forms. Refer to Section 7, Troubleshooting. RETURN can also be used for digitizing. Refer to the SET SIZE indicator light description for more information.

SET SIZE — Changes the size of the output plot when pressed in conjunction with the Directional Arrows and Center Dot. Refer to Section 4, Set Size.

INTRODUCTION

The Parameter Mode Select (PMS) operation allows you to mirror and rotate a plot, give pen commands, perform diagnostic operations, and access test plots. You can also inform the plotter via PMS of the pen and media types you are using. Given this information the plotter automatically adjusts the pen speed, pen pressure, and pen delay time.

Commands are entered by pressing a certain Touch Controls in sequence. No terminal is required for PMS operation, and more than one command may be selected at once by using sequential entry. The default for all PMS commands, except Pen and Media Type, is "off" - meaning the command is not selected.

PMS CONVENTIONS

The entry sequence for PMS commands follows:

1. Press PAUSE and the Center Dot simultaneously.

   There will be a beep. The PAUSE Indicator Light will begin blinking and continue to blink until you exit the PMS mode.

2. Press PEN SELECT to choose the first (most significant) digit of the command number.

   Each time you press PEN SELECT the Indicator Light will move down one digit; the cycle is repeated after Indicator Light number 8 is reached.

3. Press RETURN when you have reached the first digit of the command number.

4. Press PEN SELECT to choose the last (least significant) digit.

   The PEN SELECT Indicator Lights are reversed for the second selection, with the selected digit being the only one not lit.

5. Press RETURN when you have reached the second digit of the command number.

   You have now entered one PMS function. You are ready to enter another PMS function, or to exit the PMS command entry mode. (Repeat steps 2-5 for additional PMS modes that will run simultaneously.)

6. Press PAUSE and the Center Dot simultaneously to exit the PMS command entry mode.

   The selected PMS commands are now enabled and will function through all plot changes until you press CLEAR, or turn your plotter off.

PMS COMMAND LISTING

Function	Command(s)	Default/ Power-On Value	Page No.
Display Controller Processor PROM Version Number	21	Off	3-4
Display Plotter Processor PROM Version Number	22	Off	3-4
Halt On Limit	15	Off	3-4
Mirror	12	Off	3-5
Pen Type	31, 32, 33, 34	31 (liquid roller)	3-6
and Media Type	41, 42, 43, 44, 45, 46	41 (translucent)	3-6
Rotate	11	Off	3-7
Single Pen	13	Off	3-8
Single Step Mode	16	Off	3-8
Slow Pen Up Speed	14	Off	3-8
System Diagnostic Plot	23	Off	3-8
Test Pattern Plots	24, 25	Off	3-9

The following is a descriptive listing of the PMS functions in alphabetical order:

DISPLAY CONTROLLER PROCESSOR PROM VERSION NUMBER

Command number 21.

This command displays the controller processor (CP) PROM version number. The three-digit number is displayed sequentially on the PEN SELECT Indicator Lights.

DISPLAY PLOTTER PROCESSOR PROM VERSION NUMBER

Command number 22.

This command displays the plotter processor (PP) PROM version number. A two-digit number is displayed sequentially on the PEN SELECT Indicator Lights.

HALT ON LIMIT

Command number 15.

When this command is selected, plotting requests which exceed the plot limits will cause the plotter to stop and wait for operator intervention. The LIMIT Indicator Light will light and the PAUSE Indicator Light and beeper will blink and beep in unison. Pressing PAUSE will stop the blinking and beeping.

MIRROR

Command number 12.

This command allows you to create a mirror image by reflecting your plot about its X-axis. The mirror command is usually used to plot on clear inking film so that a plot may be annotated while it is being projected inverted. The pen carriage will automatically move to the left of the plotter to compensate for the reflection from first to the fourth quadrant. If this is used in conjunction with the TMS mirror command, no mirroring will occur. The second command will cancel the first.

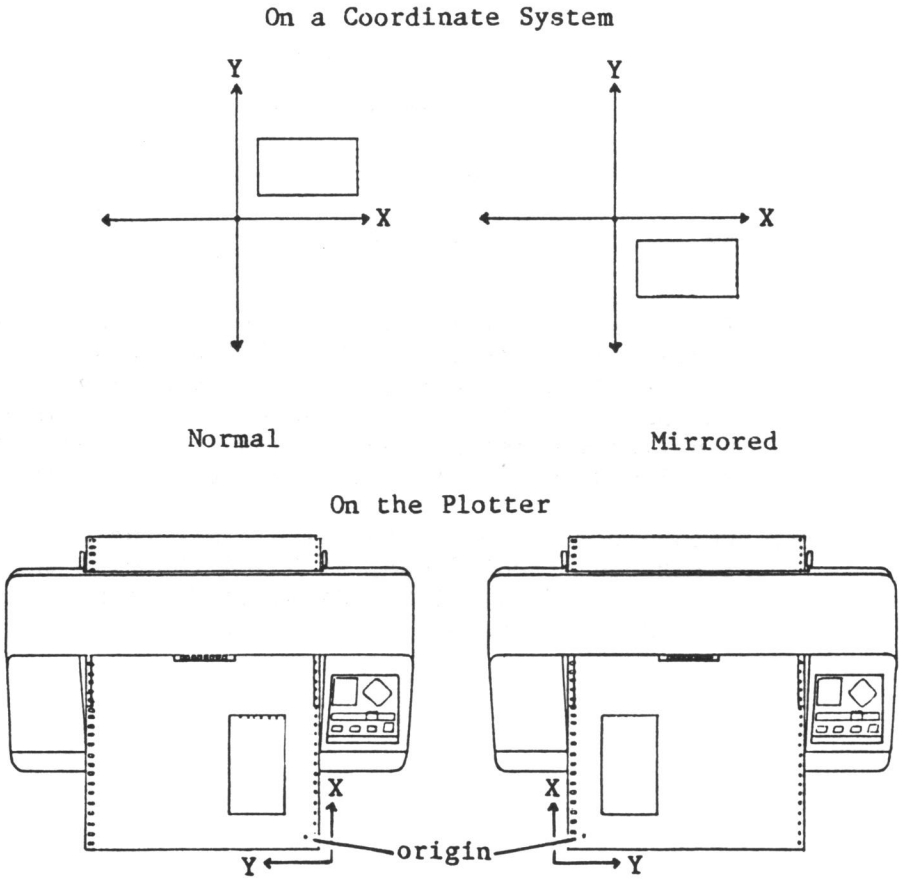


Figure 3-1
PMS Mirror Command

PEN AND MEDIA TYPE

Command number	Pen type
31	liquid roller
32	nylon tip
33	not used
34	ballpoint

Command number	Media type
41	translucent
42	high-quality bond
43	clear inking film
44	matte film
45	vellum type E

These commands tell the plotter the type of pen and media installed. This allows the plotter to automatically select the best settings for the plotting characteristics of the pen and media you are using. These commands override TMS pen type and media type commands. The default for pen type is liquid roller; the default for media type is translucent.

NOTE: When using these PMS functions, set the rotary dial which controls pen speed (SW04A) at 0 and the dial which controls pen pressure (SW04B) at 5. Refer to Section 1, Option Switches, for the location of these dials.

ROTATE

Command number 11.

This command rotates your plot 90 degrees clockwise. The pen carriage automatically moves to the left of the plotter to compensate for rotation from the first to the fourth quadrant. If this is used in conjunction with the TMS rotate command, the plot will be rotated 180 degrees.

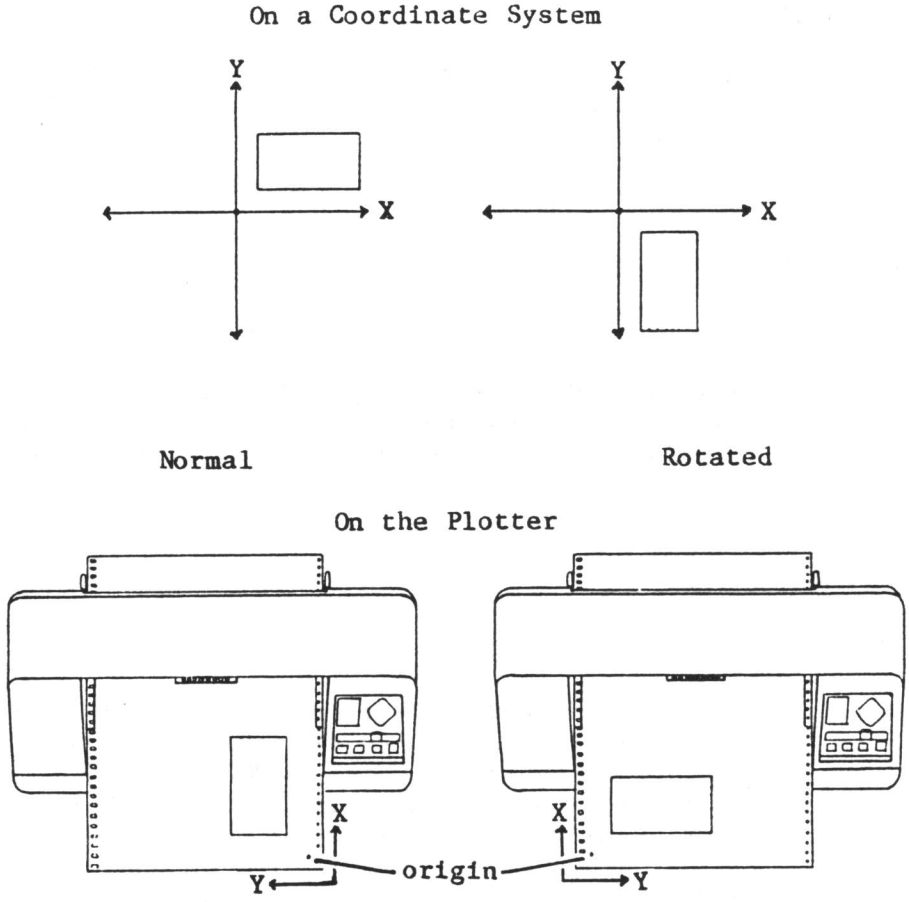


Figure 3-2
PMS Rotate Command

SINGLE PEN

Command number 13.

This command cancels all programmed pen changes. Single Pen uses whichever pen is selected using PEN SELECT on the control panel. It is useful to switch from disabled pens or to change a plot color format and overrides the TMS mapping command.

SINGLE STEP MODE

Command number 16.

This command instructs the plotter to plot one vector at a time; this is useful in seeing software pen commands. Pushing PAUSE initiates each new vector.

SLOW PEN UP SPEED

Command number 14.

This command reduces pen speed by slowing down the drum and pen carriage, when the pen is up. It is useful when doing large plots to ensure that pens don't catch on media between page changes.

SYSTEM DIAGNOSTIC PLOT

Command number 23.

This command produces a loop-test plot that checks to see if your plotter (and particularly its RS-232-C ports) is functioning normally. Mode 0 (RS-232-C GML) with Non-Error Correct Mode must be selected. Use an RS-232-C cable connected from the plotter to itself (terminal port to modem port). A system diagnostic check is made by sending the first half of the loop-test plot from the terminal port to the modem port; the second half is sent from the modem port to the terminal port. Each half is processed to generate the plot. The plot (a test pattern) is drawn by pens 1 through 8 in numerical sequence. See the end of this section for a copy of the plot.

TEST PATTERN PLOTS

Command number 24. Traveling Square

This command produces a test pattern comprised of a series of squares with two adjacent sides drawn with the same pen. Pens are randomly selected and tested on that basis. The plot dimension of the side of the square is one-half the Y-axis distance. The traveling square will continue to plot until you press CLEAR or turn the plotter off. See the end of this section for a copy of the plot.

Command number 25. Traveling Diamond

This command produces a test pattern that may be used to check for line pairing, line overshoot, and line undershoot. The plot consists of a diamond pattern that is moved a small amount in the X-axis after each diamond is plotted. The traveling diamond will continue to plot until you press CLEAR or turn the plotter off. See the end of this section for a copy of the plot.

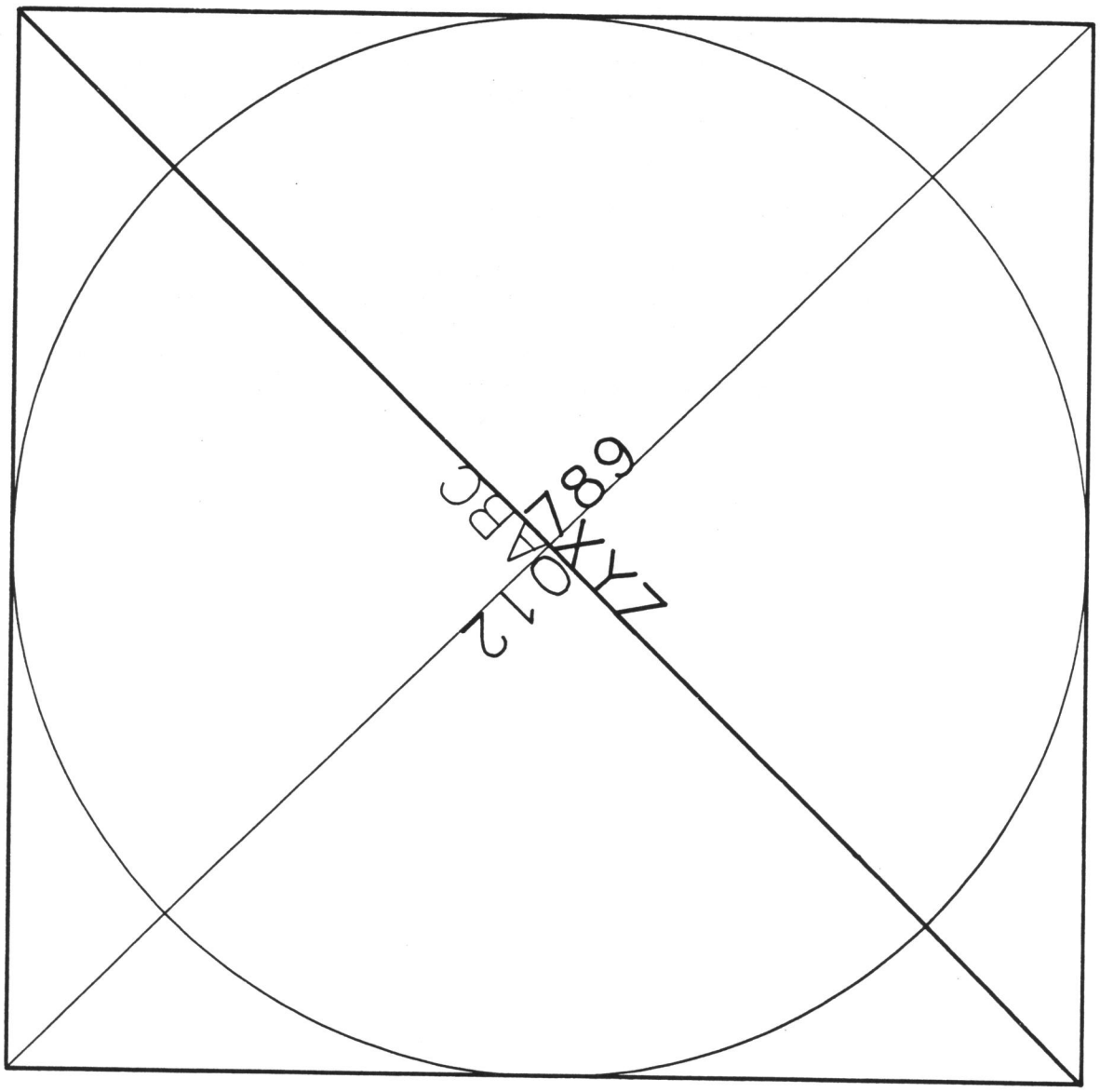


Figure 3-3
System Diagnostic Plot - PMS 23

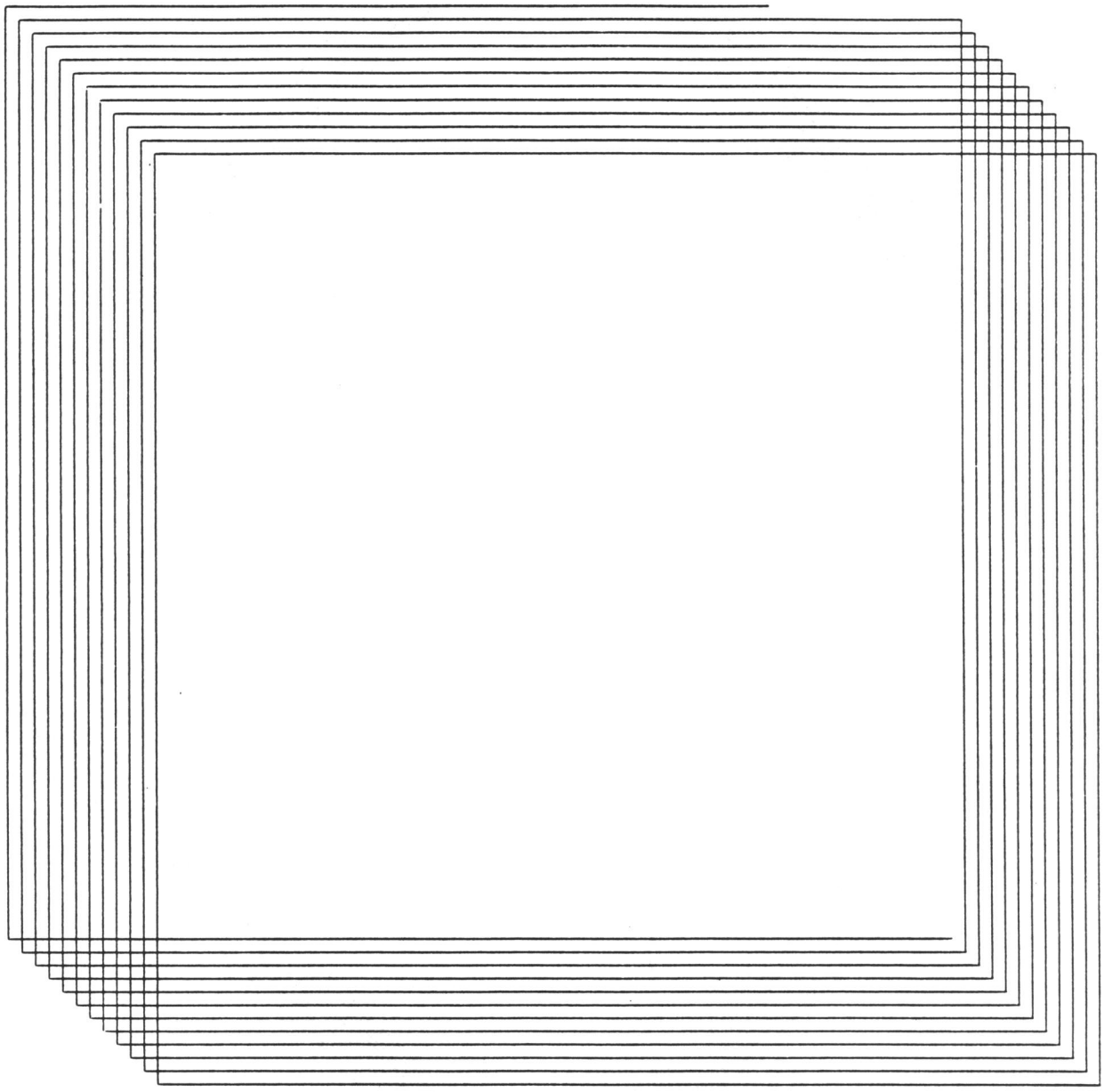


Figure 3-4
Traveling Square - PMS 24

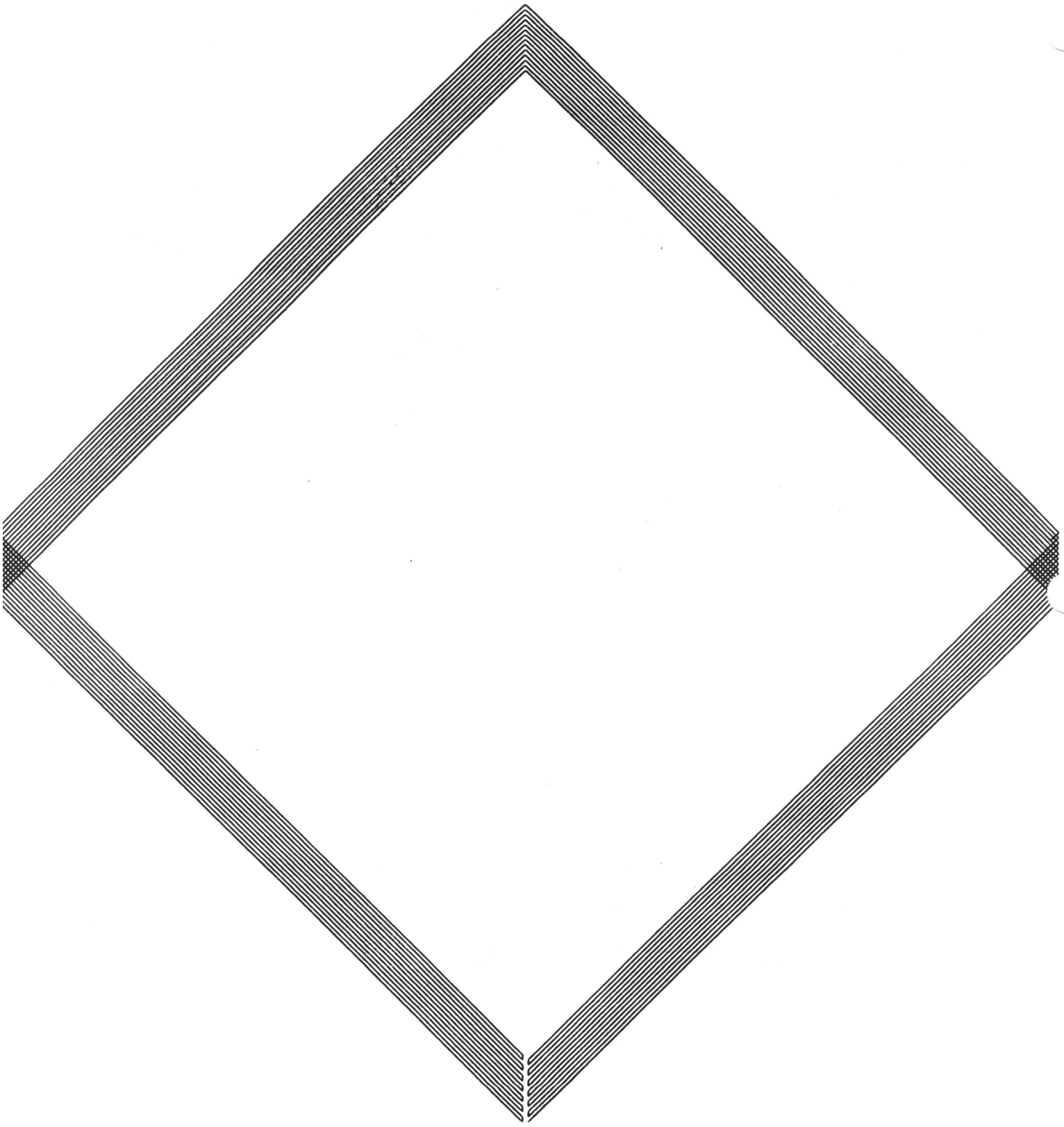


Figure 3-5
Traveling Diamond - PMS 25

INTRODUCTION

Set Size allows the plotter operator to alter the final drawing size without changing the host computer's program. Set Size has the dual advantage of being independent of plotting mode (interface and graphics language) and of not requiring that a terminal be connected to the RS-232-C terminal port.

* The SET SIZE Touch Control initiates and cancels the Set Size procedure.

* The Directional Arrows and Center Dot Touch Controls select the plot size to be produced and indicate to the plotter the incoming plot file size.

* The PAUSE Touch Control rotates the plot output orientation and/or informs the plotter that the incoming plot is in portrait rather than landscape format.

When using Set Size, it is important to understand the relationship between the incoming plot's landscape/portrait format and the plot output's normal or rotated orientation.

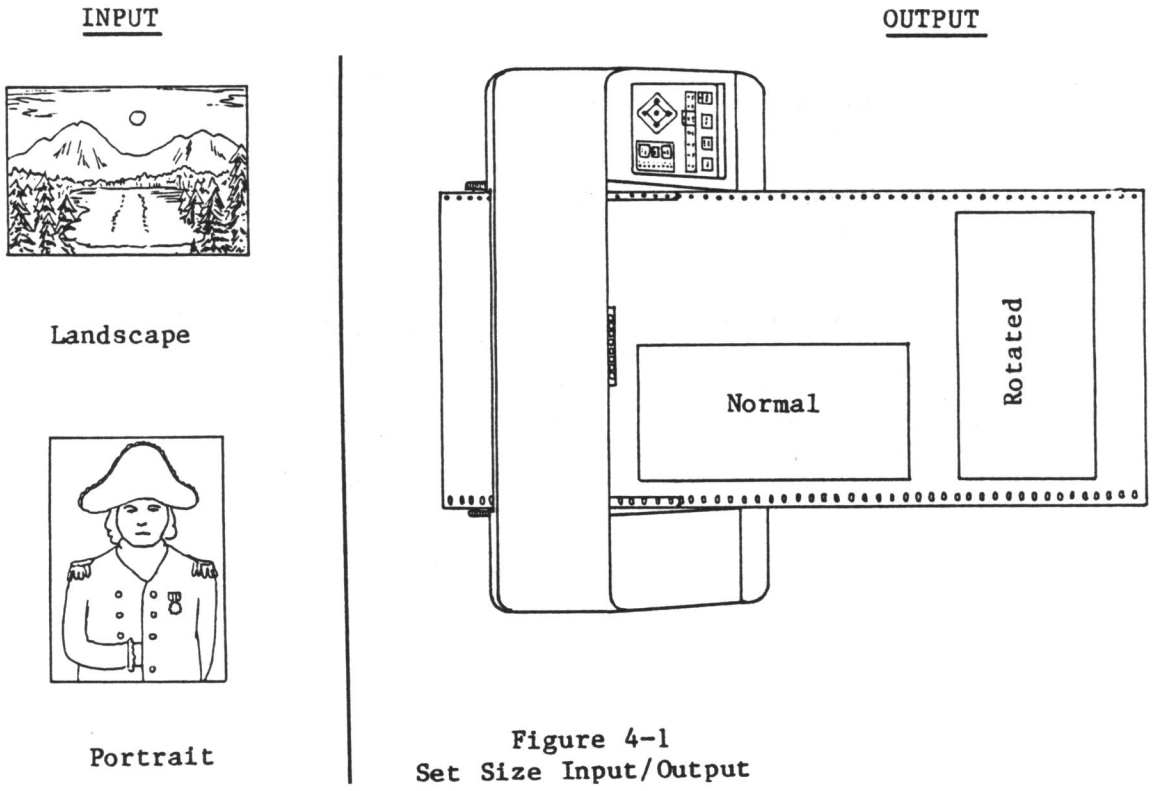


Figure 4-1
Set Size Input/Output

USING SET SIZE

To scale or change the orientation of your plot:

NOTE: If you have set your plotter for an HPGL mode (either 6 or 7), press CLEAR before you attempt to use Set Size.

1. Press the SET SIZE Touch Control. This causes the SET SIZE Indicator Light to blink and initiates the Set Size procedure.

2. OPTIONAL: Press PAUSE if your plot's output orientation should be rotated. If your plot's output orientation should be left normal, omit this step.

3. Press the Directional Arrow or Center Dot that coincides with the plot output size you want. The Directional Arrows and Center Dot are labeled with both ANSI and ISO (metric) page sizes (see Table 4-1).

4. OPTIONAL: Press PAUSE if your plot file is in a portrait format. If your plot file is in a landscape format, omit this step.

5. Press the Directional Arrow or Center Dot that coincides with the size of your plot file input data (see Table 4-1). This causes the SET SIZE Indicator Light to stop blinking and to remain lit.

Your selection remains in effect until the plotter is turned off, you press CLEAR, or until a new selection is entered. To cancel Set Size without affecting your current plot, press SET SIZE twice in succession.

Refer to Section 7, Troubleshooting for instructions on scaling for grid paper and pre-printed forms.

Four input/output combinations are possible. In each case you must specify a size and an orientation for both the input and the output. The Directional Arrows and Center Dot select size, while the PAUSE control determines orientation. The input/output combinations and their corresponding Touch Control sequences are illustrated in Figure 4-2. Where,

Input: orientation of the unscaled plot file data which is sent to the plotter

Output: orientation of the scaled plot to be plotted

TABLE 4-1
MEDIA SIZES

Directional Arrow/ Center Dot	Page Size*
	ANSI Engineering
A	8.5 X 11 inches
B	11 X 17
C	17 X 22
D	22 X 34
E	34 X 44
	ANSI Architectural
A	9 X 12 inches
B	12 X 18
C	18 X 24
D	24 X 36
	ISO
A4	210 X 297 millimeters
A3	297 X 420
A2	420 X 594
A1	594 X 841
A0	841 X 1189

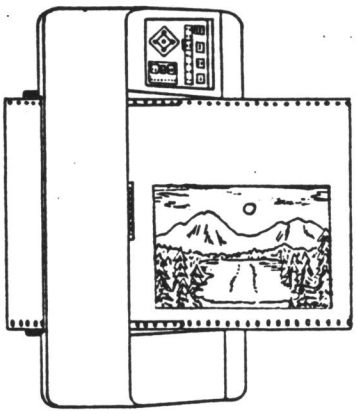
* Option Switches SW03-6,7,8 must also be set for the proper page size. In most cases your Option Switches will have been set correctly during installation. If, however, you suspect that the switches haven't been set properly, refer to Section 8 for a list of the various settings.

INPUT

OUTPUT

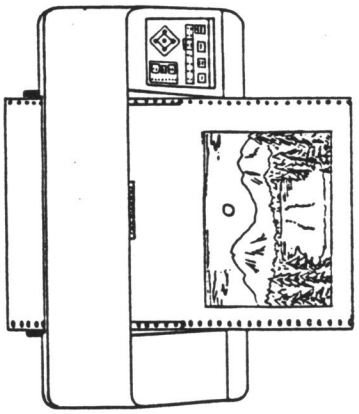
1. SET SIZE
2. Arrow/Dot
3. Arrow/Dot

Landscape ⟶ Normal



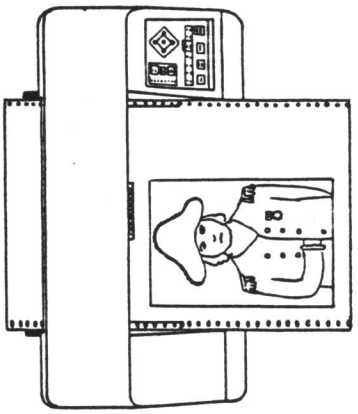
1. SET SIZE
2. PAUSE
3. Arrow/Dot
4. Arrow/Dot

Landscape ⟶ Rotated



1. SET SIZE
2. Arrow/Dot
3. PAUSE
4. Arrow/Dot

Portrait ⟶ Normal



1. SET SIZE
2. PAUSE
3. Arrow/Dot
4. PAUSE
5. Arrow/Dot

Portrait ⟶ Rotated

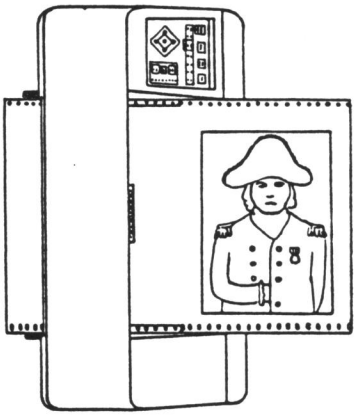


Figure 4-2
Possible Input/Output Combinations

Examples using the Set Size procedure:

A. Scaling down from a B size landscape plot file to an A size plot and rotating the output (see Figure 4-3):

   1. Press SET SIZE (initiates Set Size function).

   2. Press PAUSE (rotates output).

   3. Press A (indicates size you want to plot).

   4. Press B (indicates size of incoming plot file).

      Results: an A size rotated orientation plot.

B. Scaling down from a C size portrait plot file to an A size plot (see Figure 4-3):

   1. Press SET SIZE (initiates Set Size function).

   2. Press A (indicates size to be plotted).

   3. Press PAUSE (indicates incoming data is portrait format).

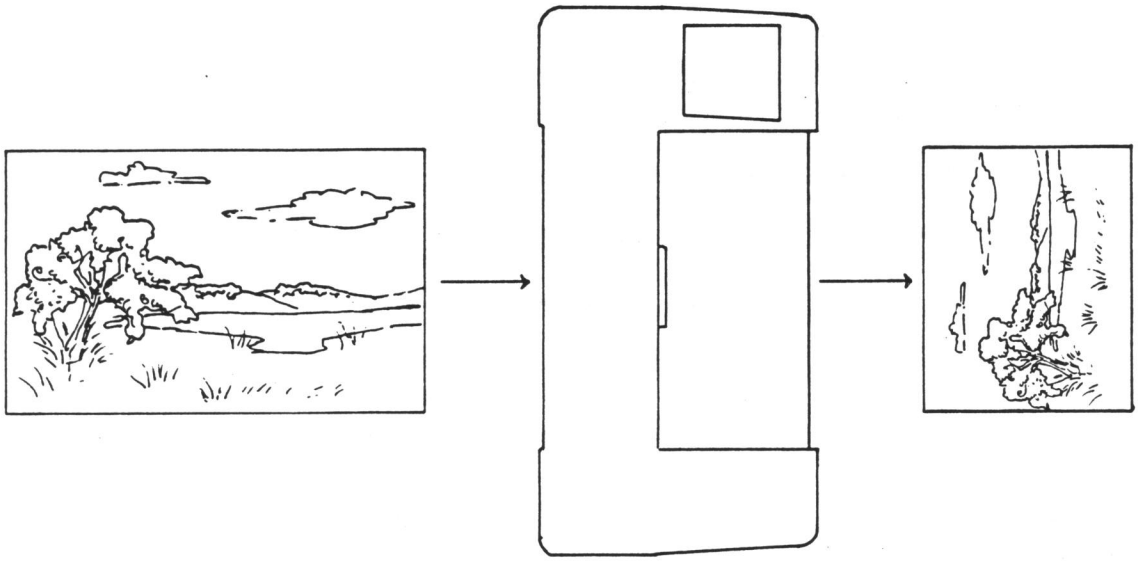
   4. Press C (indicates size of incoming plot file).

      Results: an A size normal orientation plot.

AUTOMATIC REPOSITIONING

To prevent your plots from overlapping, make sure to check the Option Switches for Automatic Repositioning (SW03-6,7,8). Automatic Repositioning controls the form feeds between plots. If you are scaling small plots up to a larger size, you must instruct the plotter to leave a bigger space between plots. Conversely, if you are scaling large plots down to a smaller size (as in Examples A and B), you must instruct the plotter to leave a smaller space between plots. For a complete explanation of Automatic Repositioning, refer to the definitions in Section 8.

Example A



Example B

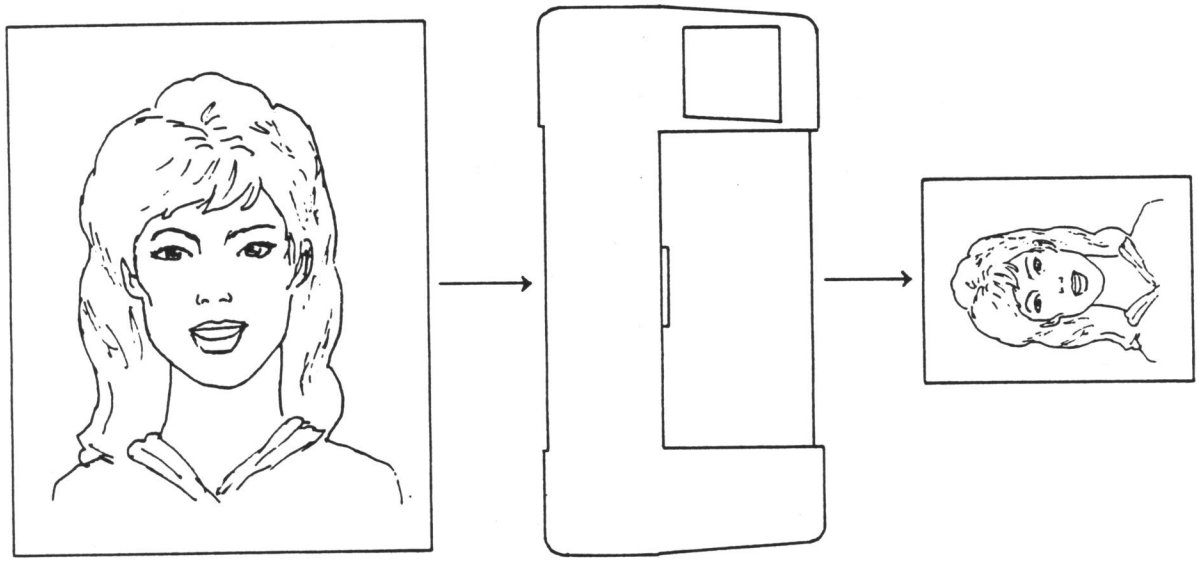


Figure 4-3
Set Size Examples

OVERVIEW

The Terminal Monitor System (TMS) allows you to control plotter operation through terminal keyboard commands. TMS features include plot rotation, mirroring, scaling and windowing, selection of pen and media type, and control of plotting and communication attributes. This feature is available for GML RS-232-C (Mode 0) only.

To use TMS your terminal must be connected directly to the plotter via an RS-232-C cable (use the TO TERMINAL port on the plotter).

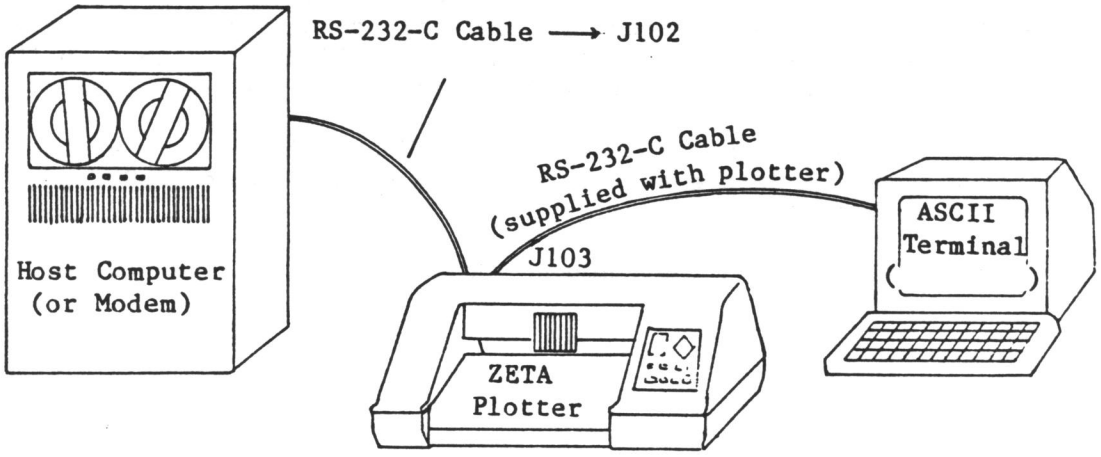


Figure 5-1
TMS Cabling Set-up

TMS can be activated at any time while the plotter is in the plotting mode. Once activated, anything typed at the terminal will be intercepted by the plotter and not sent to the host computer. However, host computer messages can still appear on the terminal. If you are typing on the terminal when a host message is received, your typing may be garbled on the monitor screen. For this reason, you should try to enter TMS commands at times when you are not expecting messages from the host computer.

There is no limit to the number of TMS commands you can use at the same time. If you enter the same command more than once, however, the plotter will recognize only the last command. All TMS functions take effect on the next plot after entry. These functions remain in effect until you press CLEAR or turn the plotter off.

TMS CONVENTIONS

To enter TMS:

1. Type a Control G (^ G) on your keyboard before you begin plotting. A command prompt (*) will appear.

2. Type in the desired command and any necessary parameters separated by spaces or commas (refer to the specific command description for a list of the parameters required for that command).

3. After you have typed in the command and any necessary parameters, press RETURN. Your command will be sent to the plotter and registered for the next plot. The prompt "*" will again appear on the screen, indicating that TMS is ready to accept another command.

4. If you make a mistake while entering a TMS command, type a Control U (^ U) to delete a line, or press BACKSPACE or RUBOUT to delete a character.

5. To exit TMS, type in the command *QUIT and press RETURN twice.

In short:

Keyboard Entry	Function
Control G (^ G)	enters TMS (a greeting message, including the PROM version identification, will be displayed on the terminal followed by a command prompt).
*	command prompt
* command_parameters	format for entering TMS commands; separate parameters with spaces or commas
Control U (^ U)	deletes lines
BACKSPACE or RUBOUT	deletes characters
* QUIT	exits TMS

MONITOR MESSAGES

You may get monitor messages while entering TMS commands. This list describes the messages and explains what to do about them:

ZETA 8 FAMILY MONITOR, RELEASE 5.4, VERSION 1.11

This greeting message appears on the screen after you type Control G (^G), and indicates that you have entered TMS.

* [asterisk]

This is a prompt character that tells you to enter your next command.

ILLEGAL COMMAND

This message is displayed when you type a command which doesn't exist. Simply retype the command. If you are unsure of the command, type HEL, and a list of available commands will be displayed.

ILLEGAL ARGUMENT

This message tells you that the parameters you have set will not work because you:

* Used a real number where it should have been an integer
* Omitted a parameter when it was required
* Used a parameter with an invalid character
* Used a parameter not valid to the command
* Typed in too many parameters

Re-enter your command and correct parameters, remembering to press RETURN when you finish.

TMS COMMAND LISTING

Function	Command	Default/Power On Value	Page No.
Echo	ECH	off	5-5
Help Command Listing	HEL	Not Applicable	5-6
Line Turnaround Delay	LTD	0 0	5-7
Media Type	MED	0 (translucent)	5-8
Mirror	MIR	off	5-9
Pen Delay Time	PDT	0	5-11
Pen Mapping	MAP	1 2 3 4 5 6 7 8	5-13
Pen Type	PEN	0 0 0 0 0 0 0 0 (liquid roller)	5-15
Plot	PLO	on	5-17
Plot Quality	QUA	1	5-18
Plot Scale	SCA	off (1.0 1.0)	5-20
Quit	QUI	Not Applicable	5-21
Rotate	ROT	off	5-22
Terminal Print	PRI	0	5-24
Zoom/Windowing	ZOO	off (1.0 1.0)	5-25

ECHO

Command

ECH

Purpose

Echo enables terminal echo of characters. If you have a full-duplex system you will want echo on; for a half-duplex system you will want echo off.

If you are not sure how echo should be set for your system, try to operate the system as is. If you get double letters or nothing at all on your terminal, change echo to the opposite setting.

Parameters

On or Off.

Errors

Missing parameter.
Parameter other than On or Off.

Default

Off

Example

*ECH on
Characters sent to the plotter are echoed back to the terminal.

HELP COMMAND LISTING

Command

HEL

Purpose

The Help Command Listing lists all available TMS commands on the terminal.

Parameters

None; any given are ignored.

Errors

None.

Default

Not Applicable.

Example

```
*HEL
All available commands listed.
```

LINE TURNAROUND DELAY

Command

LTD

Purpose

Line Turnaround Delay slows down the host's transmission of data to the plotter. This delay is useful when your plotter is connected to a remote system and the risk of transmission errors is high.

NOTE: The plotter must be set for Error Correct in order for the LTD command to work.

Parameters

Two integers in the 0 through 255 range.

The first integer indicates the length of time in milliseconds that the plotter will wait after receiving a message from the host before sending a response.

The second integer measures the pause in milliseconds that the plotter will place between each character of the response.

If only one integer parameter is given, it will apply to both functions.

Errors

A missing parameter.
Parameters out of the 0 to 255 range.

Default

0

Example

*LTD 0 128
Sets the first LTD at zero milliseconds and the second LTD at 128 milliseconds.

MEDIA TYPE

Command

MED

Purpose

Media Type tells the plotter which type of media is being used, and allows the plotter to select the proper settings for this media. Media Type command by itself will not produce the desired results unless the Pen Type command is entered at the same time. The plotter must know both the pen and media type in order to generate the best quality plot.

Parameters

One integer, in the 0 through 4 range where:

0 = translucent
1 = high-quality bond
2 = clear inking film
3 = Mylar
4 = vellum type E

Errors

Missing parameter.
Parameter out of the 0-4 range.
More than one parameter.

Default

0

Example

*MED 1
Sets plotting characteristics for high-quality bond.

Special Considerations

The PMS Media Type command will override this TMS command.

When using the Media Type command, set the rotary dial which controls pen speed (SW04A) at 0 and the dial which controls pen pressure (SW04B) at 5. Refer to Section 1, Option Switches, for the location of these dials.

MIRROR

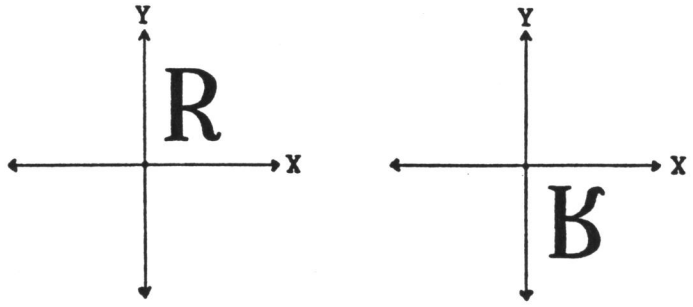
Command

MIR

Purpose

Mirror enables mirroring of a plot around the X-axis. You must MOVE THE PEN CARRIAGE TO THE LEFT END OF THE PEN RAIL to compensate for the new plot orientation (see Figure 5-2).

On a Coordinate System



Normal Mirrored

On the Plotter

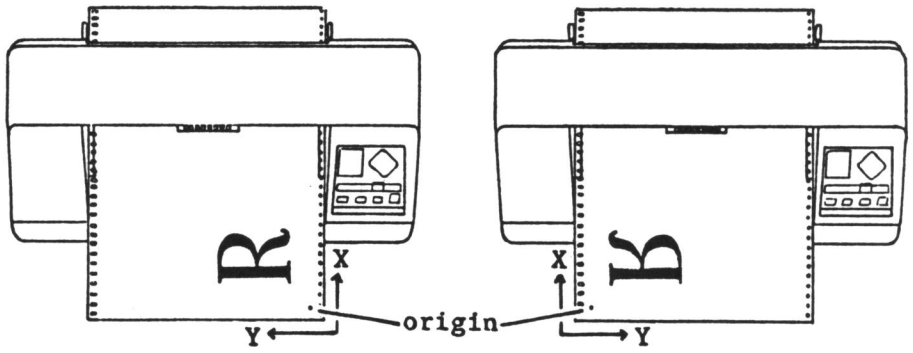


Figure 5-2
TMS Mirror Command

Parameters

On or Off.

Errors

A missing parameter.
Parameter other than On or Off.

MIRROR (cont'd)

Default

Off

Example

*MIR on
This mirrors a plot about its X-axis.

Special Considerations

If you use the PMS Mirror command together with the TMS Mirror command, no mirroring will occur. The second command inputted will cancel the first.

PEN DELAY TIME

Command

PDT

Purpose

Pen Delay Time is the interval between the end of a pen motion and the raising or lowering of the pen. There are two delay times:

1. pen-up time - the interval between the pen's withdrawal from the media and any pen motion

2. pen-down time - the interval between the pen's contact with the media and any pen motion.

Pen types requiring higher pressure, such as ballpoint, require less time to apply ink to the media after the beginning of a motion. These pens are ready to write in a shorter time than nylon tip pens, which require lower pressure and tend to bounce before they come to rest in position. The symptoms of insufficient PDT are:

ghosting - at the beginning of a vector stroke, the pen moves across the media but the ink doesn't flow

tailing - at the end of a vector stroke, the ink in the pen continues to flow onto the media after the pen has been lifted

Ghosting is eliminated by increasing the pen-down delay. Tailing is eliminated by increasing the pen-up delay. Use the lowest possible pen delay time settings which will give consistently good results.

If only one integer parameter is given, it will apply to both pen movements. If two integer parameters are specified, the first applies to pen-up time and the second to pen-down time. Note that the pen delay time is cumulative i.e., the times you select with this TMS command will be added onto the default pen delay time.

	Default Times (ms)	
	Up	Down
Nylon Tip	20	20
Ballpoint	0	0
Liquid Roller	0	0
Liquid Ink	70	20

Parameters

One or two integers in the range of 0 to 255 ms.

Errors

A missing parameter.
A parameter less than 0 or greater than 255.

Default

0 (liquid roller setting)

Example

*PDT 16
This adds a delay time of 16 ms to both pen-up and pen-down delay time defaults.

*PDT 1 255
This adds a pen-up delay time of 1 ms, and a pen-down delay time of 255 ms to the defaults.

PEN MAPPING

Command

MAP

Purpose

Pen Mapping allows you to define a different order for pen selection. This command can help you prevent the pens from drying out and the pen caps in the pen cartridge from wearing out.

If you plan to run a number of consecutive plots which use only one or two pens, you can use the Pen Mapping command to substitute other pens for the ones called for in the plot file. For instance, you might want to substitute a pen in the third position for the overworked pen in the first position. In this case you would map logical pen 1 (i.e., the pen called by the plot file) to physical pen 3.

This command doesn't affect the operation of the Pen Type and Plot Quality commands. These commands apply to the physical pens regardless of the corresponding logical pens.

Parameters

Choose up to eight parameters from the integers 1-8. The first integer entered represents the physical pen to which the logical pen 1 will be mapped, and the second integer maps logical pen 2, and so on. If you don't specify eight parameters, the logical pens without parameters will default to their physical counterparts (see the example below).

Errors

Too many parameters
No parameters
Parameters out of 1-8 range

Default

1 2 3 4 5 6 7 8 (no mapping)

Example

```
*MAP 1 2 4 6
Logical pen 1 is mapped to physical pen 1.
Logical pen 2 is mapped to physical pen 2.
Logical pen 3 is mapped to physical pen 4.
Logical pen 4 is mapped to physical pen 6.
Logical pens 5, 6, 7, and 8 are mapped to
physical pens 5-8.
```

Special Considerations

The PMS Single Pen command overrides the TMS Pen Mapping command.

PEN TYPE

Command

PEN

Purpose

Pen Type tells the plotter which type of pen is being used, and allows the plotter to select the proper speed, pressure, and delay time settings for this pen type. The Pen Type command by itself will not produce the desired results unless the Media Type command is entered at the same time. The plotter must know both the pen and media type to generate the best quality plot. Pen Type is not affected by mapping.

Parameters

Eight integers, one for each pen in the pen cartridge, in the 0 through 3 range where:

0 = liquid roller
1 = nylon tip
2 = not used
3 = ballpoint

Errors

Missing parameters.
Parameters out of the 0-3 range.
Too many parameters.

Default

0 0 0 0 0 0 0 0

Examples

*PEN 0 0 1 1 1 3 3 3
Sets pens 1 and 2 to be liquid rollers, pens 3, 4, and 5 nylon tip, etc.

*PEN 1
Sets all pens to be nylon tip.

PEN TYPE (cont'd)

Special Considerations

The PMS Pen Type command overrides the TMS Pen Type command.

The Pen Type command doesn't apply to liquid ink pens.

When using the Pen Type command, set the rotary dial which controls pen speed (SW04A) at 0 and the dial which controls pen pressure (SW04B) at 5. Refer to Section 1, Option Switches, for the location of these dials.

Command

PLO

Purpose

PLOT is used to disable plotting of incoming GML. This command is useful in the Error Correct environment with the TMS PRI command when you want to acquire data from a remote system. With PLOT OFF, all incoming data passes through the plotter and goes directly to a storage device connected to the terminal port (see Figure 5-3). Data transmission may slow down due to actual plotting. PLOT OFF can speed up plot data transmission. The GML can then be plotted locally, saving expensive connect time.

NOTE: The plotter must be set for Error Correct in order for the PLO command to work.

Parameters

On - plotter enabled to plot
Off - plotter disabled

Errors

Missing parameter.
Parameter other than On or Off.

Default

On

Example

*PLO off
Disables plotting so that incoming data can be stored for future plotting.

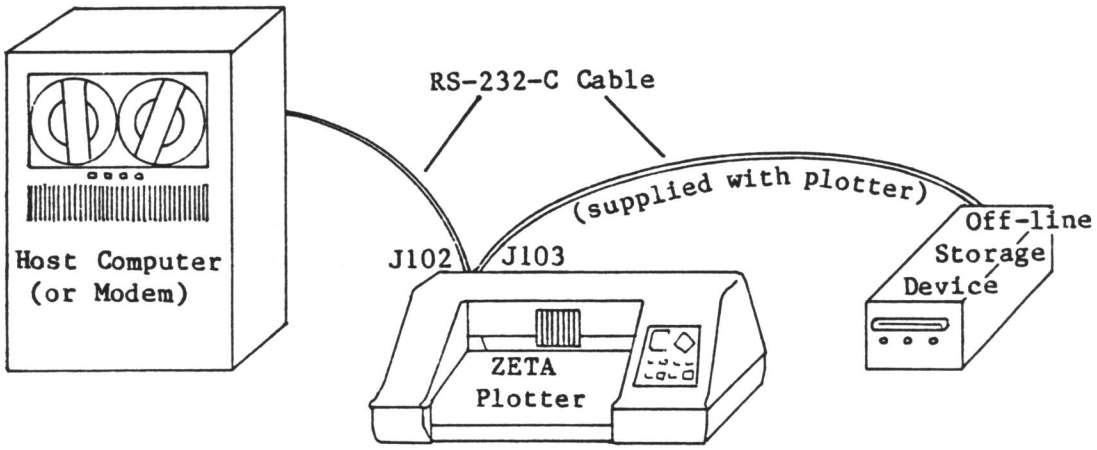


Figure 5-3
Cabling Diagram for TMS Plot Command

PLOT QUALITY

Command

QUA

Purpose

Plot Quality is useful when you need very accurate resolution for plotting text or small characters and symbols. This function allows you to specify a general quality parameter which in turn sets several plotting parameters. The affected parameters are speed, acceleration, and end-point stop time (deceleration around corners). Mapping does not affect these functions.

In general, the better the quality, the slower the throughput; i.e., quality and throughput are inversely related. To maximize throughput, set the quality number at a low value (see Figure 5-4). For best results, use the Pen and Media Type commands in conjunction with Plot Quality.

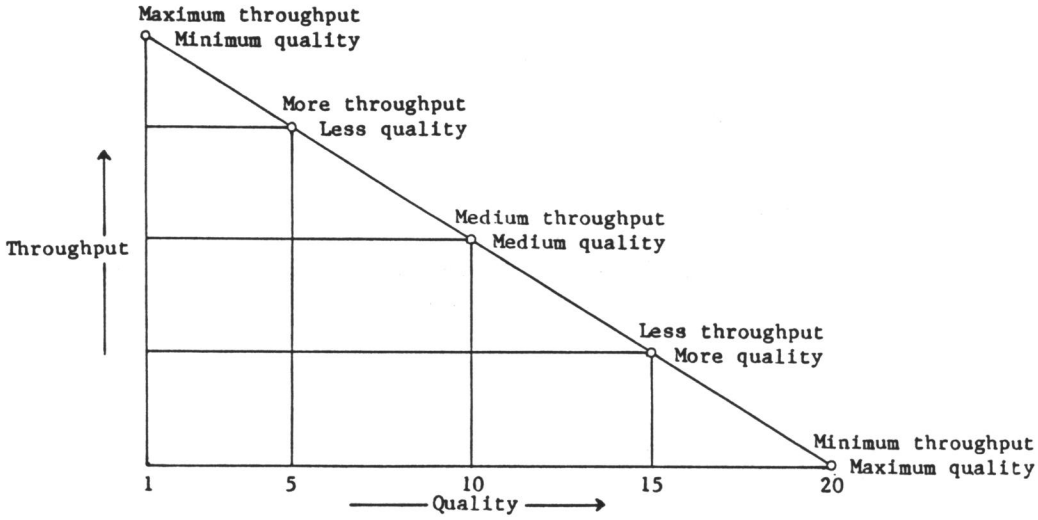


Figure 5-4
Inverse Relation Between
Quality and Throughput

Parameters

Eight integers (one for each pen) in the 1 through 20 range with 1 giving the fastest throughput and 20 giving the slowest. If you specify fewer than eight parameters, the missing values will default to the last specified value.

Errors

No parameters.
Parameters out of range.
Too many parameters.

Default

1 (highest throughput)

Examples

*QUA 1 2 3 4 8 12 16 20
Sets plot quality for respective pens.

*QUA 20
Sets all pens at maximum quality.

Special Considerations

When using the Plot Quality command, set the rotary dial which controls pen speed (SW04A) at 0. Refer to Section 1, Option Switches, for the location of this dial.

PLOT SCALE

Command

SCA

Purpose

Plot Scale changes the scaling of a plot along either or both axes.

Parameters

Two real numbers (numbers with decimal points), the first for X-axis scaling and the second for Y-axis scaling (where 1.0 gives no scaling).

Errors

Non-positive parameter.
No parameters.

Default

Off
(Scaling factors are 1.0 and 1.0.)

Example

*SCA 2.0 3.5
Increases plot size by a factor of 2.0 in the X direction and 3.5 in the Y direction.

QUIT

Command

QUI

Purpose

Quit allows you to exit TMS.

Parameters

None.

Errors

Including a parameter.

Default

Not Applicable.

Example

*QUI
Exits TMS.

ROTATE

Command

ROT

Purpose

Rotate causes a plot to rotate clockwise 90 degrees. You must MOVE THE PEN CARRIAGE TO THE LEFT END OF THE PEN RAIL to compensate for the new plot orientation (see Figure 5-5).

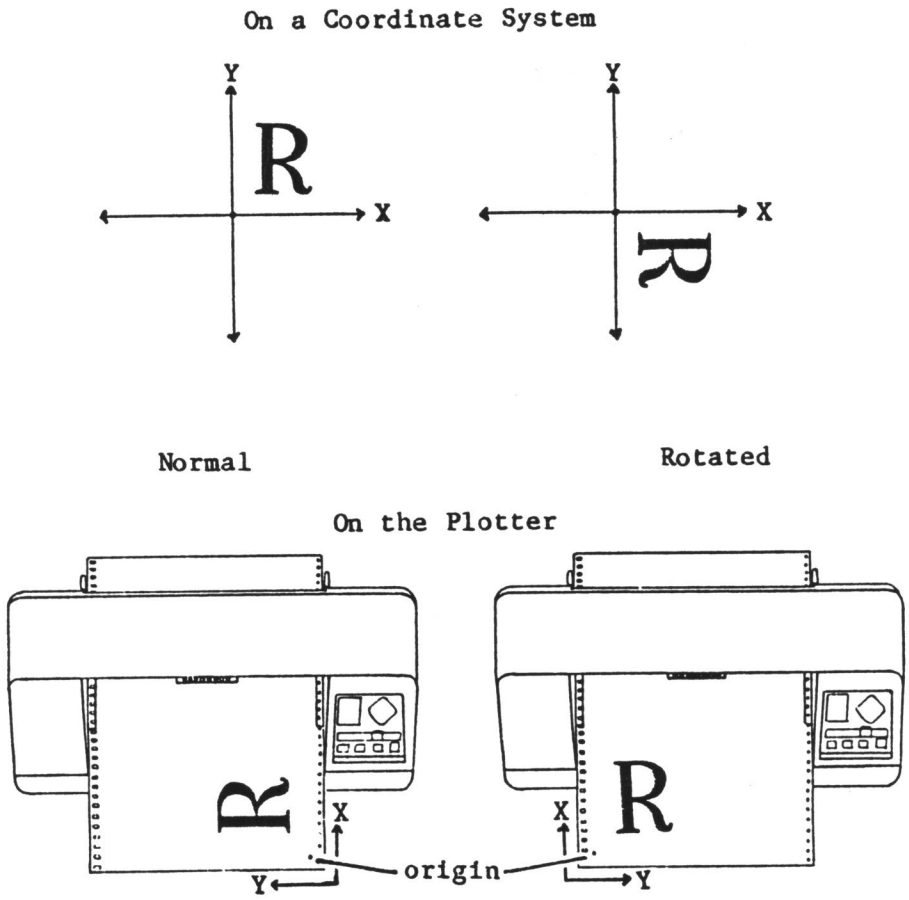


Figure 5-5
TMS Rotate Command

Parameters

On or Off.

Errors

A missing parameter.
Parameter other than On or Off.

Default

Off

Example

*ROT on
Rotates the plot 90 degrees clockwise.

Special Considerations

If you use the PMS Rotate command together with the TMS Rotate command, the plot will be rotated 180 degrees clockwise.

TERMINAL PRINT

Command

PRI

Purpose

Terminal Print enables terminal printing of incoming GML on a terminal connected to the "TO TERMINAL" port on the plotter. It is useful for inspecting GML for plot file errors.

Parameters

Select one from the following list:

0 = do not print terminal data (PRI off)
1 = print all incoming data
2 = print corrected data only (used only when Error Correct is on in Mode 0)

Errors

Missing parameters.
Parameters out of range.
Too many parameters.

Default

0

Example

*PRI 1
Prints all incoming data.

ZOOM or WINDOWING

Command

ZOO

Purpose

Zoom allows you to plot a specific portion or "window" of the plot. You must define the window position (in inches measured from the origin of the original plot) and any scale factors by giving six parameters: the coordinates (X,Y) of two points which define the window and two scale factors for the new plot (see Figure 5-6).

Parameters

Real number coordinates (numbers with a decimal point) must be listed, in the following order:

1st, 2nd - X and Y for lower left corner of the window (i.e., the corner closest to the origin)
3rd, 4th - X and Y for upper right corner of the window
5th - X scale factor (where a factor of 1.0 gives no scaling)
6th - Y scale factor (where a factor of 1.0 gives no scaling)

NOTE: To measure the window properly, the original plot must be oriented correctly on the page, i.e., without any rotation, scaling, mirroring, etc.

Parameters (cont'd)

For example, the points A and B in Figure 5-6 define a window. Measured from the origin, point A has the coordinates (a,b) and point B has the coordinates (c,d). These values should be listed in the order (a,b,c,d). The X and Y scale factors should follow the coordinate values.

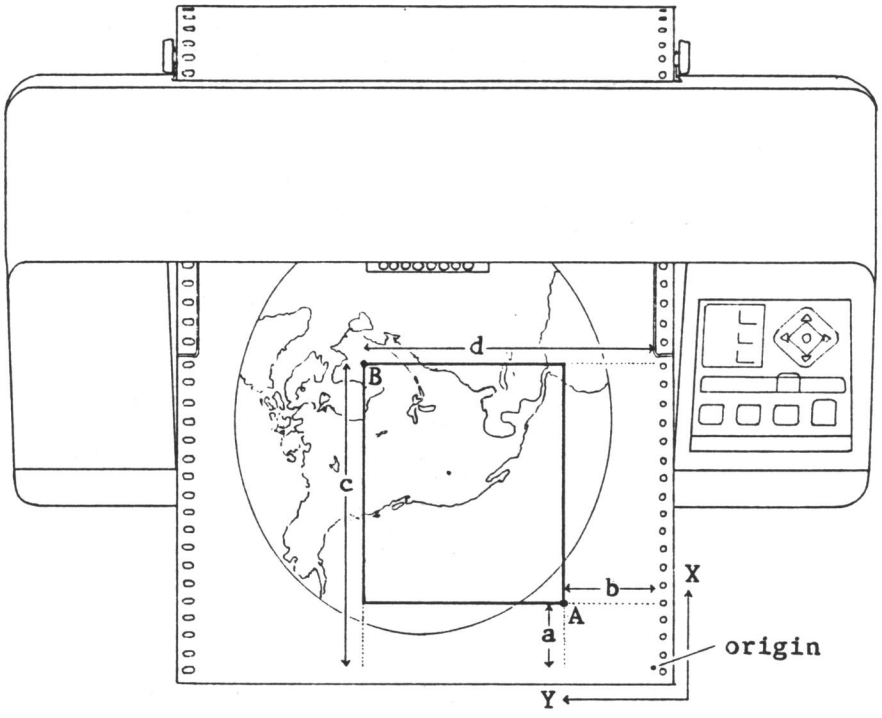


Figure 5-6
Defining a Window Using ZOOM

Errors

Non-positive scale factors.
Too many or no parameters.

Default

There is no windowing and the scaling factors are both 1.0.

Examples

*ZOO 1. 1. 4. 5. 2.
The lower left corner of the window has coordinates (1.0, 1.0) and the upper right corner has coordinates (4.0, 5.0), and the X and Y values of the final plot are both scaled by a factor of 2.0.

*ZOO 1. 2. 3.2 4.6 0.4 1.
The lower left corner of the window has coordinates (1.0, 2.0) and the upper right corner has coordinates (3.2, 4.6), and the X-axis is scaled by 0.4 and the Y-axis is scaled by 1.0 (no scaling).

Special Considerations

When you begin plotting with the Zoom command, the DATA light will come on, but the plotter will not plot immediately. The plotter is actually waiting to receive the window portion of the plot file. Sometimes the plotter will plot for a few seconds, stop, and then resume plotting. This occurs when the window data is not grouped in one area of the plot file but spread throughout.

FUNDAMENTAL PLOTTING SUBROUTINES (FPS)*

FORTRAN and C-callable subroutines are designed for on-line, off-line, and remote plotting. FPS provides all industry standard functions and over 40 additional subroutines.

The following software packages are available to enhance the abilities of your ZETA plotter:

ZDDM* AND ZMD-PLOT*

ZDDM and ZMD-PLOT are conversion packages that will translate IBM's Graphic Data Display Manager (GDDM), Releases 2 and 3 (ZDDM), and 4 (ZMD-PLOT) into the Graphic Machine Language (GML) that is needed to drive a ZETA plotter with the P87 option. Operating system dependent assembly language routines are utilized to read data files. Operating systems currently supported include VM/SP CMS, MVS/TSO, and DOS/VSE for ZDDM and VM, MVS, IMS, and CICS versions for ZMD-PLOT.

FUNCTIONAL SUBROUTINES*

These FORTRAN-callable subroutines supplement the Fundamental Plotting Subroutines. They provide the capability of plotting frequently used patterns such as arrowheads, dimension lines, shaded polygons, and bars for charts. Also included are logarithmic scaling and axis notation.

ZCHART*

ZCHART, a versatile business graphics package, produces multicolor line, bar, and pie charts. Plot description and data files are stored separately, allowing you to run new data with an existing chart design or the same data with a different chart design.

TYPSET*

TYPSET is a group of FORTRAN subroutines capable of producing over 1,300 characters. Character sets available include Roman, Greek, Italian, Script, Gothic, Cyrillic, musical, electrical, weather, map, mathematical, and punctuation. Characters may be plotted at any angle and height-to-width aspect ratio. Subscripting, backspacing, and variable spacing are also included.

* This software is for GML users only.

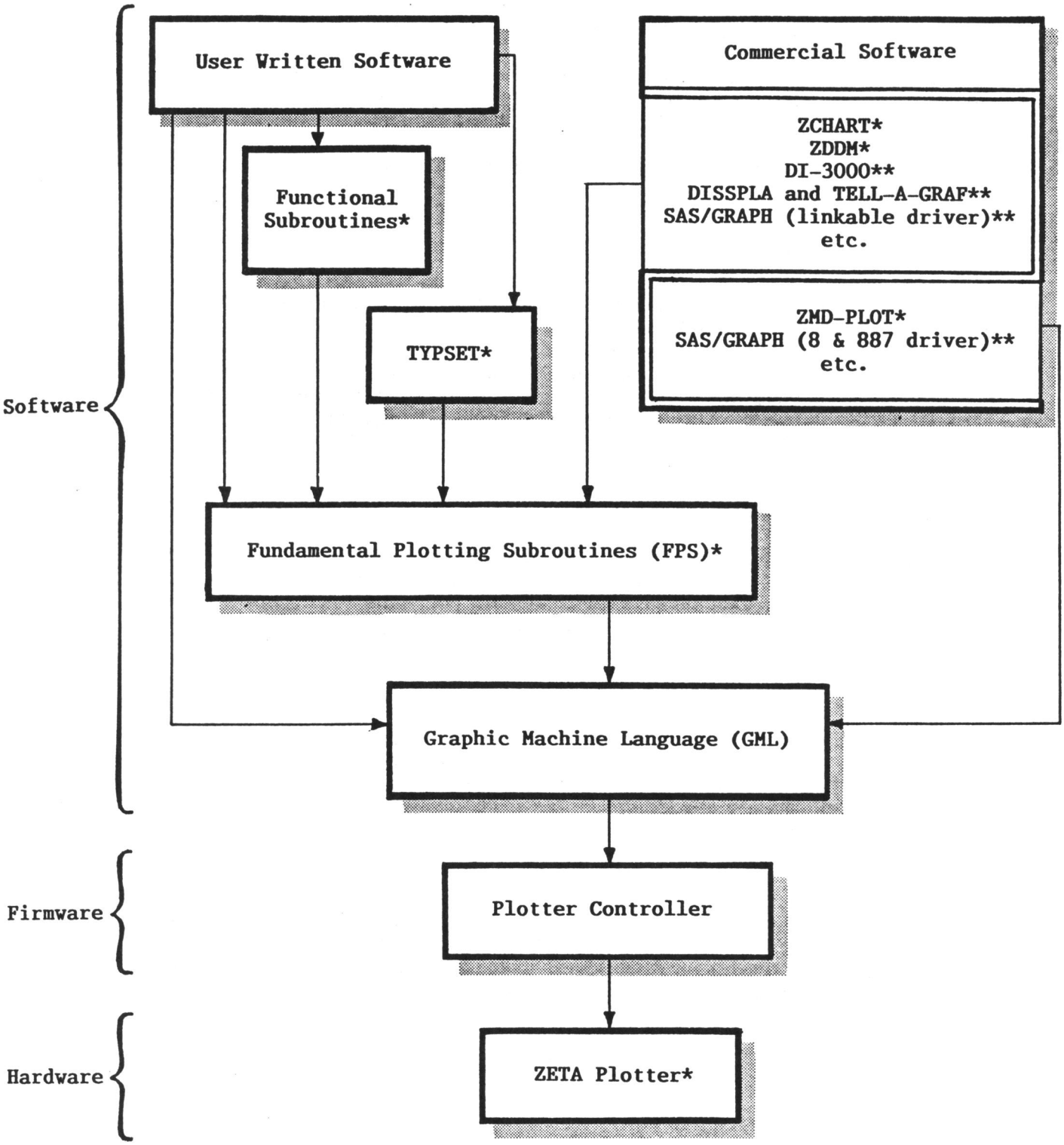


Figure 6-1
Software Flow Diagram

* Bruning products

** DI-3000 is a product of Precision Visuals, Inc. DISSPLA and TEL-A-GRAF are products of Integrated Software Systems Corp. SAS/GRAPH is a product of SAS Institute, Inc.

FONT TYPES*

Three fonts are included with your ZETA plotter: proportionally spaced Simplex Roman, fixed-space Simplex Roman, and proportionally spaced Outline Swiss. Proportional spacing adjusts the letter spacing to produce text that is aesthetically pleasing and easy to read. The fixed-space font is used for aligning numeric columns and similar applications. The fixed-space Simplex Roman font is the plotter's default value.

Switching between the proportional and fixed fonts is done in software through the FPS subroutine ZFONT (IFONT, LUNIT). (For more information refer to the FPS User Guide.) An IFONT of zero selects the fixed-space Simplex Roman font, an IFONT of one selects the proportionally spaced Simplex Roman font, and an IFONT of 40 selects the Outline Swiss Font. The LUNIT variable is not currently used, but is present for future expansion. Italic, condensed, and extended characters may be produced by using ZETA character attribute operations SLANT and ASPECT. A detailed description of these and other subroutines is given in the FPS User Guide.

Figure 6-2, on the following page, shows variations you can achieve with the proportionally spaced Roman Simplex font supplied with your plotter. (For specifics see the FPS User Guide, "Example 8 - 7 Styles of Font 1.")

ROM PACKS

ROM Packs are available to expand the three-font capability built into your plotter by providing additional character sets and symbols. An Engineering ROM Pack, a Business ROM Pack, and an APL ROM Pack (IBM character set) are currently available. Like the FPS software ROM Packs will work only in the GML modes (0-2).

* All ZETA fonts may be accessed in GML modes. Only fonts 1 and 0, proportionally spaced and fixed-space Simplex Roman fonts, are accessed in HPGL modes.

SIMPLEX ROMAN

SIMPLEX ROMAN ITALIC

SIMPLEX ROMAN BOLD

SIMPLEX ROMAN EXTENDED

SIMPLEX ROMAN CONDENSED

SIMPLEX ROMAN BOLD EXTENDED

SIMPLEX ROMAN ITALIC CONDENSED

Figure 6-2
Seven Styles of the
Proportionally Spaced Font

ERROR CODES AND RECOVERY

If the plotter diagnostic program detects a hardware or software error, the ERROR Indicator Light will light up and the PEN SELECT Number Lights will indicate the code number of the error. The plotter will stop and not function, until the error condition is corrected.

The error codes listed below are generally user correctable. Errors 4 and 6, however, are the only errors which can be corrected without aborting the current plot. If you are unable to correct an error or if an unlisted error code appears, call Customer Support at 800-233-3020.

Error Code Number	Description & Correction
1	Y-AXIS following error too large--Call Customer Support
2	Y-AXIS following error too large--Call Customer Support
4	Out of paper--Check your paper feed
6	Too many PEN UP/DOWN commands at the same point--Eliminate these commands from your plot file
21	Pen selection error--Check for proper seating of the pen cartridge and pens
22	Pen type sensor error--Call Customer Support
41	Loop time overflow--Call Customer Support
42	Controller communication error--Call Customer Support
44	System error--Call Customer Support
45	Bad interrupt (8259 level 7)--Call Customer Support
46	Interrupt of type 0 (illegal)--Call Customer Support
47	Stack overflow--Call Customer Support
52	Baud rate error--Make sure the setting on the baud rate Option Switch is correct

53	Usart overrun error--Check your Option Switches for correct handshaking setting
54	Parity error--Check Option Switches for correct even/odd and enabled/disabled settings
56	Bad opcode from controller (CP)--Call Customer Support
61	Bad PROM--Call Customer Support
62	Bad ROM checksum error-Call Customer Support
63	Bad ROM pack--Check to make sure the font called for is on the pack and that the pack is properly seated
67	Bad RAM--Call Customer Support
68	Bad RAM error--Call Customer Support
81	Buffer overrun--Check your Option Switches for correct handshaking setting
82	Invalid mode--Check for correct Option Switch mode and settings
83	Invalid plotting command--Eliminate the invalid plotting command from your plot file
84	Miscellaneous error or failure--Call Customer Support
86	Divisional overflow--Check for parameters set to zero which may result in division by zero (an aspect value of zero for example).
88	Polygon buffer overflow--Restart the plot and use a memory management command to allocate more memory for the polygon. In GML, the command is 77M and in HPGL, the command is ESC.T

To correct an error do the following:

1. Press PAUSE to stop the beep.
2. Press the Center Dot.
3. Attempt error correction (refer to above chart).
4. Press PAUSE to continue your plot (for errors 4 and 6 only); or
   press NEXT PLOT to begin a new plot; or
   press CLEAR to reset the plotter.

FUSE CHECK

If your plotter won't turn on, the fuse may have blown. To check the fuse:

1. Turn the plotter off.

2. Disconnect the power cord from the back of the plotter. (As a safety feature you won't be able to slide the fuse cover open until the power cord has been removed from the plotter back.)

3. Slide the clear plastic fuse cover to the left as shown in Figure 7-1.

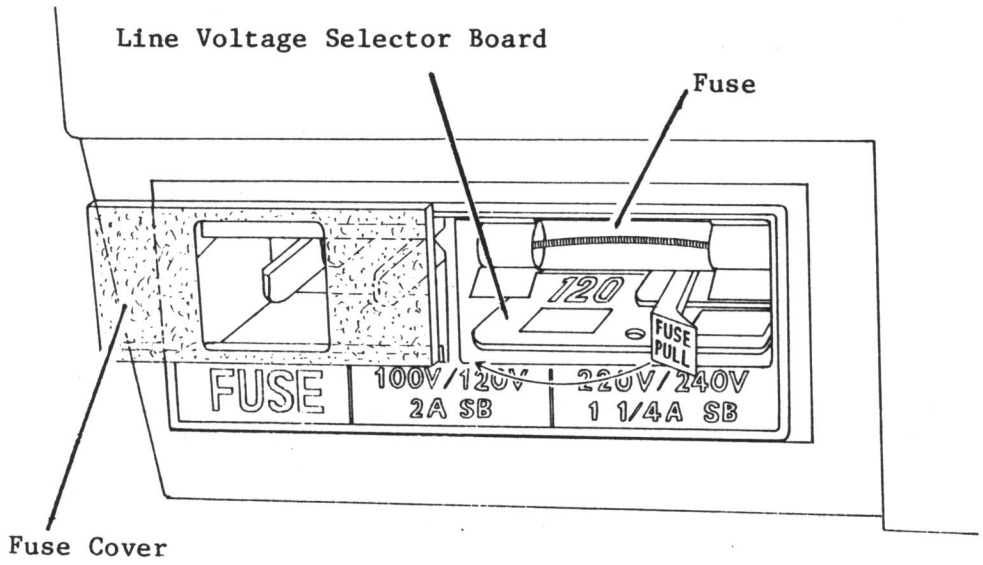


Figure 7-1
Fuse and Line Voltage Selector Board

4. Pull the FUSE PULL lever out and to the left (see Figure 7-1).

5. Remove the fuse. If the filament is blackened, bulging, or bent, replace the fuse with a new one. For a 110 volt system, use a 2 amp slow blow fuse. For a 220 volt system, use a 1-1/4 amp slow blow fuse.

6. Push the FUSE PULL lever back into place before you attempt to insert the new fuse.

LINE VOLTAGE SELECTOR BOARD CHECK

If the second fuse is quickly destroyed, check the Line Voltage Selector Board located underneath the FUSE PULL lever.

1. Remove the power cord and slide the plastic fuse cover to the left.

2. Check the voltage number on the Line Voltage Selector Board (see Figure 7-1). This voltage should match the voltage of your system.

3. If the number is not correct, remove the fuse and pull out the board with a pair of pliers.

4. Turn the board over and reinsert it with the correct voltage facing up.

5. Push the FUSE PULL lever back into place.

6. Insert a good fuse and attach the power cord.

If the plotter is still inoperable, call Customer Support at 800-233-3020.

GRIDSCALE FUNCTION

The gridscale function is used to adjust scaling factors when using grid paper and other pre-printed forms, such as pre-printed drafting paper. Changes in temperature or humidity can stretch or shrink media, which may change the line spacing on grid paper. Gridscaling allows the plotter to compensate for variations in spacing by scaling to the actual spacing on the paper.4

1. Load your media and insert a bore sight into pen position 1. For instructions on inserting a bore sight refer to the Pen and Media Guide.

2. Choose a grid intersection on the media to use as a reference point. Make sure the point is in the lower right corner of the media (as viewed from the front of the plotter). See Figure 7-2. Using the directional arrows, position the bore sight directly over the intersection.

3. Press CENTER DOT and RETURN simultaneously. The plotter will beep.

4. Press RETURN if you are using metric grid paper. The plotter will beep. If you are not using metric media, proceed directly to step 5.

5. Press PAUSE and the media will move forward 5 inches (or 10 centimeters if you have selected metric units). Continue pressing PAUSE until the bore sight is close to the back edge of the media. See Figure 7-2.

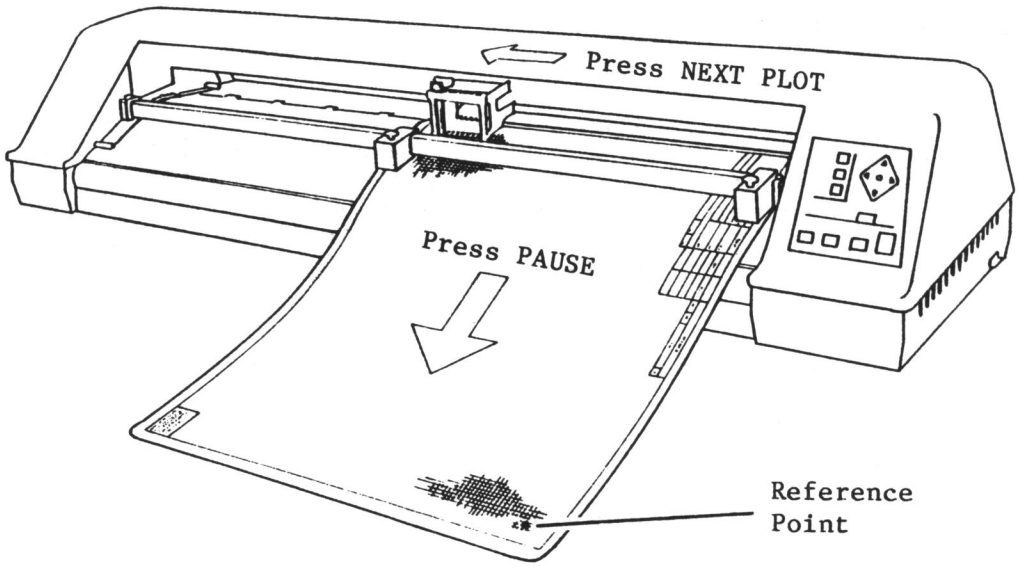


Figure 7-2
Gridscale Media and Carriage Motion

Note: This drawing shows a large plotter, but the gridscale function works for small plotters, too.

6. Press NEXT PLOT and the pen carriage will move to the left 5 inches (or 10 centimeters if you have selected metric units). Continue pressing NEXT PLOT until the bore sight is close to the left edge of the media. See Figure 7-2.

7. Use the directional arrows to position the bore sight directly over the nearest grid intersection.

8. Press RETURN. The plotter will return to the reference point and you can begin plotting.

The plotter will save the scaling factors you selected until you press CLEAR, turn the power off, or change the factors using the above method.

SERVICE AND REPAIR

If your plotter requires service or repair call Customer Support at (800) 233-3020. Before you call, write down the serial number on the back of your plotter. This information will help the Customer Service representative answer your questions.

REPACKING FOR SHIPMENT

In case you have to ship your plotter to us for service or repair, a return authorization number must be obtained from Service. Attach a tag to the plotter identifying the owner and indicate the service or repair to be performed. Include return authorization number, model number, and serial number. In any correspondence, identify the plotter by model number and serial number. To repack the plotter for shipment:

1. Restrict the movement of the pen carriage with foam blocks.
2. Place the plotter in its original container, with foam end mounts in place.
3. Ensure that the container is well sealed with strong tape or metal bands.

SPECIFICATIONS

RESOLUTION: 0.025 mm, 0.001 in., 0.05 mm, 0.002 in. or 0.025 in.

PLOTTING AREA: 297 mm by 439 m (11.7 inches by 144 feet). ISO A3-A4 and ANSI A-B sizes supported in software and plotting media.

PEN DELAY TIME: Programmable over a range of 0-255 milliseconds (ms).

INPUT DATA: ASCII encoded vector data.

INPUT DATA RATE: RS-232-C: 110, 150, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200 baud, asynchronous; IEEE-488: not applicable.

INTERFACE: RS-232-C and IEEE-488.

SPEED: 25 inches per second (ips) at all angles.

BEEPER: Audible signal alerts operator when the plotter is not functioning because of an error, programmed pause, limit overrun, or lack of paper.

PHYSICAL DIMENSIONS: 61 cm W x 30.5 cm D x 25.4 cm H (24" W x 12" D x 10" H). Weight: 14.5 kg (32 lbs).

POWER REQUIREMENTS:

Line Voltage Selector Board	Nominal Line Voltage	Operational Range--Volts	Frequency (Hz)	Fuse Req'd (amps)
100	100	90-110	47-63	2
120	115	105-125	47-63	2
220	220	200-240	47-63	1-1/4
240	230	210-250	47-63	1-1/4

Power: 100 W (average) - 120 W (peak); Heat dissipation: 340 BTU/hr (average) - 400 BTU/hr (peak).

OPERATING ENVIRONMENT: Temperature: +10 to +40 degrees Celsius (+50 to +104 degrees Fahrenheit). Humidity: to 70% maximum at +40 degrees Celsius, to 30% at +10 degrees Celsius.

STORAGE ENVIRONMENT: Temperature: -40 degrees Celsius to +70 degrees Celsius (-40 to 159 Fahrenheit). Relative Humidity: 5% to 95% (no condensation). Altitude: -150 m to 15,000 m (-500 ft to +50,000 ft).

MODE SETTINGS

This section contains the Option Switch settings for the modes which can be implemented on the ZETA 8 plotter. A glossary of terms and an explanation of Error Correct (used in Mode 0 only) follows the mode settings.

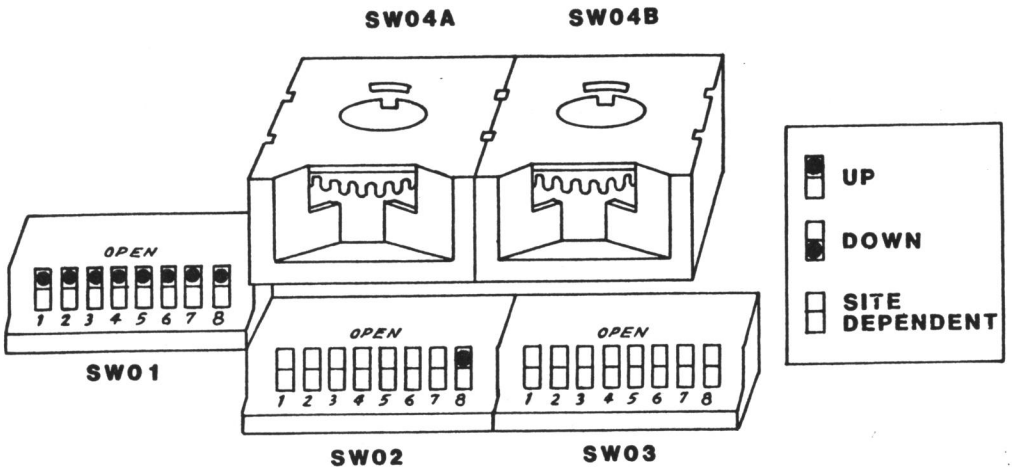
TABLE 8-1
ZETA 8 MODES

Mode No.*	Description**	Page No.
0	GML - RS-232-C	8-2
1	GML - IEEE-488	8-5
2	Not Implemented	8-8
3	Printer - RS-232-C	8-9
4	Printer - IEEE-488	8-12
5	Not Implemented	8-15
6	HPGL - RS-232-C	8-16
7	HPGL - IEEE-488	8-19
8	TPE - RS-232-C	8-22
9	Not Implemented	8-25
10	CCP-960 - RS-232-C	8-26

* Only the modes you specifically order will be operational on your plotter.

** GML: (Graphics Machine Language) the machine language which drives a ZETA plotter. You should select a GML mode if you are using FPS (Fundamental Plotting Subroutines) software or any other software which produces GML.
HPGL: Hewlett-Packard Graphics Language
TPE: Tektronix Plotter Emulator
CCP: CalComp

MODE 0
GML - RS-232-C



Mode 0 Switch Format

SW01 Mode Selection

1 through 8 - UP

SW02 Resolution

1	2	3	
UP	UP	UP	- 0.0025 inch
DOWN	UP	UP	- 0.002 inch
UP	DOWN	UP	- 0.001 inch
DOWN	DOWN	UP	- Not Used
UP	UP	DOWN	- 0.05 mm
DOWN	UP	DOWN	- 0.025 mm
UP	DOWN	DOWN	- Not Used
DOWN	DOWN	DOWN	- Not Used

4 - Error Correct Mode

DOWN - Error Correct
UP - Non-Error Correct

SW02 If Error Correct Mode (SW02-4) is set DOWN, set Line Turnaround Delay.

5 - Line Turnaround Delay

DOWN - Enabled
UP - Disabled

OR

If Error Correct Mode (SW02-4) is set UP, set Handshaking Protocol.

Handshaking Protocol

DOWN - XON/XOFF (software)
UP - CTS/RTS (hardwire)

6 - Chord Angle Control

DOWN - Enabled
UP - Disabled

7 - Plot Limits

DOWN - Simulated Mechanical (Hard)
UP - Clipping (Virtual)

8 - UP

SW03

Baud Rate

1	2	3	
UP	UP	UP	- 110
DOWN	UP	UP	- 300
UP	DOWN	UP	- 1200
DOWN	DOWN	UP	- 1800
UP	UP	DOWN	- 2400
DOWN	UP	DOWN	- 4800
UP	DOWN	DOWN	- 9600
DOWN	DOWN	DOWN	- 19200

Parity

4	5	
UP	UP	- None/Space (0)
DOWN	UP	- Even
UP	DOWN	- Odd
DOWN	DOWN	- None/Mark (1)

SW03

Automatic Repositioning/Set Size Drawing Standard

6	7	8	AUTO. REPOSITIONING	SET SIZE
UP	UP	UP	- ANSI Eng. - Large Pages	ANSI Eng.
DOWN	UP	UP	- ANSI Eng. - Small Pages	ANSI Eng.
UP	DOWN	UP	- ANSI Arch. - Large Pages	ANSI Arch.
DOWN	DOWN	UP	- ANSI Arch. - Small Pages	ANSI Arch.
UP	UP	DOWN	- ISO - Large Pages	ISO
DOWN	UP	DOWN	- ISO - Small Pages	ISO
UP	DOWN	DOWN	- No Repositioning	ANSI Eng.
DOWN	DOWN	DOWN	- Free-Form Repositioning	ANSI Eng.

SW04 - A

Speed Selection

10 Positions

1 = 10%
* *
9 = 90%
0 = 100% (Full Speed)

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

SW04 - B

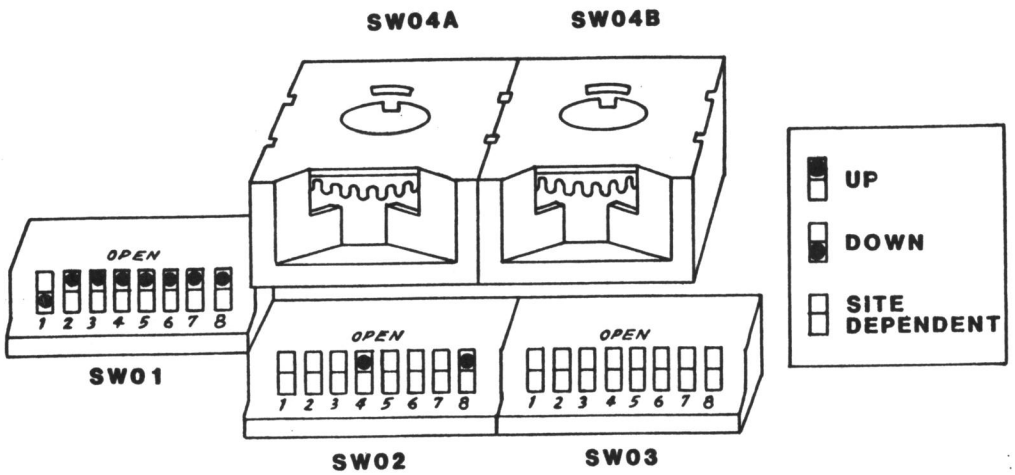
Pen Pressure

10 Positions

0 = Minimum
* *
9 = Maximum

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

MODE 1
GML - IEEE-488



Mode 1 Switch Format

SW01

Mode Selection

1 - DOWN
2 through 8 - UP

SW02

Resolution

1	2	3	
UP	UP	UP	- 0.0025 inch
DOWN	UP	UP	- 0.002 inch
UP	DOWN	UP	- 0.001 inch
DOWN	DOWN	UP	- Not Used
UP	UP	DOWN	- 0.05 mm
DOWN	UP	DOWN	- 0.025 mm
UP	DOWN	DOWN	- Not Used
DOWN	DOWN	DOWN	- Not Used

4 - UP - Not Used

5 - SRQ Buffer Control

DOWN - Send SRQ when buffer is nearly full
UP - No SRQ sent (default)

6 - Chord Angle Control

DOWN - Enabled
UP - Disabled

7 - Plot Limits

DOWN - Simulated Mechanical (Hard)
UP - Clipping (Virtual)

8 - UP

SW03

Bus Address

	Switches 1	2	3	4	5
0 -	UP	UP	UP	UP	UP
1 -	DOWN	UP	UP	UP	UP
2 -	UP	DOWN	UP	UP	UP
3 -	DOWN	DOWN	UP	UP	UP
4 -	UP	UP	DOWN	UP	UP
5 -	DOWN	UP	DOWN	UP	UP
6 -	UP	DOWN	DOWN	UP	UP
7 -	DOWN	DOWN	DOWN	UP	UP
8 -	UP	UP	UP	DOWN	UP
9 -	DOWN	UP	UP	DOWN	UP
10 -	UP	DOWN	UP	DOWN	UP
11 -	DOWN	DOWN	UP	DOWN	UP
12 -	UP	UP	DOWN	DOWN	UP
13 -	DOWN	UP	DOWN	DOWN	UP
14 -	UP	DOWN	DOWN	DOWN	UP
15 -	DOWN	DOWN	DOWN	DOWN	UP
16 -	UP	UP	UP	UP	DOWN
17 -	DOWN	UP	UP	UP	DOWN
18 -	UP	DOWN	UP	UP	DOWN
19 -	DOWN	DOWN	UP	UP	DOWN
20 -	UP	UP	DOWN	UP	DOWN
21 -	DOWN	UP	DOWN	UP	DOWN
22 -	UP	DOWN	DOWN	UP	DOWN
23 -	DOWN	DOWN	DOWN	UP	DOWN
24 -	UP	UP	UP	DOWN	DOWN
25 -	DOWN	UP	UP	DOWN	DOWN
26 -	UP	DOWN	UP	DOWN	DOWN
27 -	DOWN	DOWN	UP	DOWN	DOWN
28 -	UP	UP	DOWN	DOWN	DOWN
29 -	DOWN	UP	DOWN	DOWN	DOWN
30 -	UP	DOWN	DOWN	DOWN	DOWN
Listen Only -	DOWN	DOWN	DOWN	DOWN	DOWN

SW03

Automatic Repositioning/Set Size Drawing Standard

6	7	8	AUTO. REPOSITIONING	SET SIZE
UP	UP	UP	- ANSI Eng. - Large Pages	ANSI Eng.
DOWN	UP	UP	- ANSI Eng. - Small Pages	ANSI Eng.
UP	DOWN	UP	- ANSI Arch. - Large Pages	ANSI Arch.
DOWN	DOWN	UP	- ANSI Arch. - Small Pages	ANSI Arch.
UP	UP	DOWN	- ISO - Large Pages	ISO
DOWN	UP	DOWN	- ISO - Small Pages	ISO
UP	DOWN	DOWN	- No Repositioning	ANSI Eng.
DOWN	DOWN	DOWN	- Free-Form Repositioning	ANSI Eng.

SW04 - A

Speed Selection

10 Positions

1 = 10%
* *
9 = 90%
0 = 100% (Full Speed)

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

SW04 - B

Pen Pressure

10 Positions

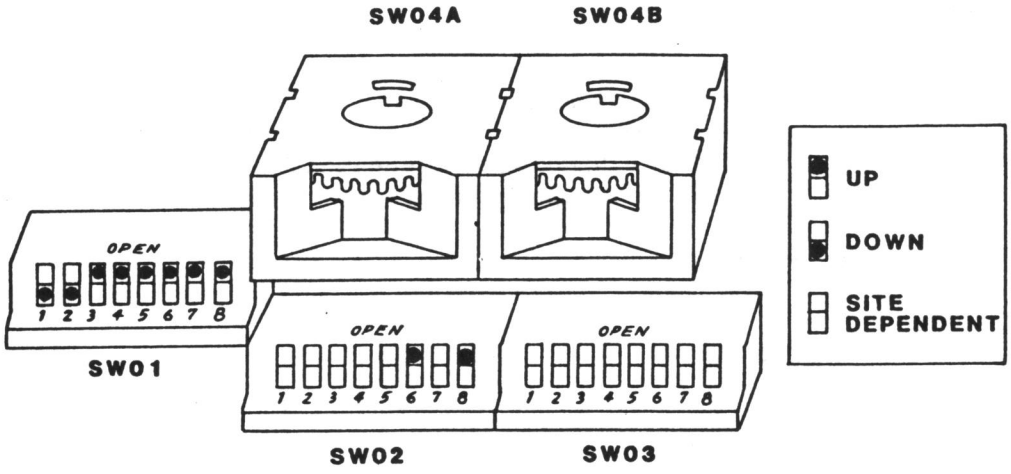
0 = Minimum
* *
9 = Maximum

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

MODE 2

NOT IMPLEMENTED

MODE 3
PRINTER - RS-232-C



Mode 3 Switch Format

SW01

Mode Selection

1 and 2 - DOWN
3 through 8 - UP

SW02

1 - Carriage Return Generates Line Feed

DOWN - Host Sends <CR> Only
UP - Host Sends <CR><LF>

2 - Text Line Position

DOWN - Parallel to Y-Axis
UP - Parallel to X-Axis

3 - Number Of Characters/Line

DOWN - 132 Characters
UP - 80 Characters

4 - Character Spacing

DOWN - Proportionally Spaced
UP - Fixed Spaced

5 - Handshaking Protocol

DOWN - XON/XOFF (software)
UP - CTS/RTS (hardwire)

SW02

6 - UP - Not Used

7 - Plot Limits

DOWN - Simulated Mechanical (Hard)
UP - Clipping (Virtual)

8 - UP

SW03

Baud Rate

1	2	3	
UP	UP	UP	- 110
DOWN	UP	UP	- 300
UP	DOWN	UP	- 1200
DOWN	DOWN	UP	- 1800
UP	UP	DOWN	- 2400
DOWN	UP	DOWN	- 4800
UP	DOWN	DOWN	- 9600
DOWN	DOWN	DOWN	- 19200

Parity

4	5	
UP	UP	- None/Space (0)
DOWN	UP	- Even
UP	DOWN	- Odd
DOWN	DOWN	- None/Mark (1)

SW03

Set Size Drawing Standard

6	7	8	
UP	UP	UP	- ANSI Engineering
DOWN	UP	UP	- ANSI Engineering
UP	DOWN	UP	- ANSI Architectural
DOWN	DOWN	UP	- ANSI Architectural
UP	UP	DOWN	- ISO
DOWN	UP	DOWN	- ISO
UP	DOWN	DOWN	- ANSI Engineering
DOWN	DOWN	DOWN	- ANSI Engineering

SW04 - A

Speed Selection

10 Positions

1 = 10%
* *
9 = 90%
0 = 100% (Full Speed)

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

SW04 - B

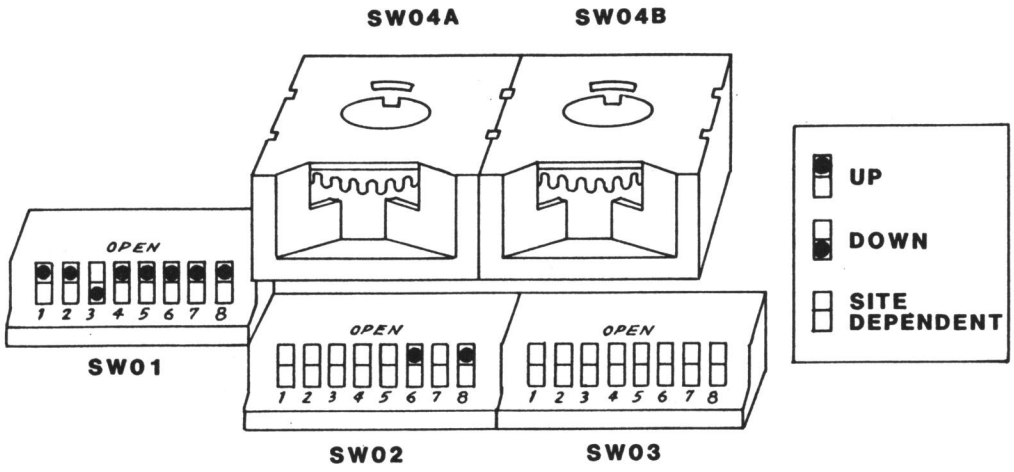
Pen Pressure

10 Positions

0 = Minimum
* *
9 = Maximum

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

MODE 4
PRINTER - IEEE-488



Mode 4 Switch Format

SW01

Mode Selection

1, 2, 4 through 8 - UP
3 - DOWN

SW02

1 - Carriage Return Generates Line Feed

DOWN - Host Sends <CR> Only
UP - Host Sends <CR><LF>

2 - Text Line Position

DOWN - Parallel to Y-Axis
UP - Parallel to X-Axis

3 - Number Of Characters/Line

DOWN - 132 Characters
UP - 80 Characters

4 - Character Spacing

DOWN - Proportionally Spaced
UP - Fixed Spaced

5 - SRQ Buffer Control

DOWN - Send SRQ when buffer is nearly full
UP - No SRQ sent (default)

6 - UP - Not Used

SW02

7 - Plot Limits

DOWN - Simulated Mechanical (Hard)
UP - Clipping (Virtual)

8 - UP

SW03

Bus Address

	Switches 1	2	3	4	5
0 -	UP	UP	UP	UP	UP
1 -	DOWN	UP	UP	UP	UP
2 -	UP	DOWN	UP	UP	UP
3 -	DOWN	DOWN	UP	UP	UP
4 -	UP	UP	DOWN	UP	UP
5 -	DOWN	UP	DOWN	UP	UP
6 -	UP	DOWN	DOWN	UP	UP
7 -	DOWN	DOWN	DOWN	UP	UP
8 -	UP	UP	UP	DOWN	UP
9 -	DOWN	UP	UP	DOWN	UP
10 -	UP	DOWN	UP	DOWN	UP
11 -	DOWN	DOWN	UP	DOWN	UP
12 -	UP	UP	DOWN	DOWN	UP
13 -	DOWN	UP	DOWN	DOWN	UP
14 -	UP	DOWN	DOWN	DOWN	UP
15 -	DOWN	DOWN	DOWN	DOWN	UP
16 -	UP	UP	UP	UP	DOWN
17 -	DOWN	UP	UP	UP	DOWN
18 -	UP	DOWN	UP	UP	DOWN
19 -	DOWN	DOWN	UP	UP	DOWN
20 -	UP	UP	DOWN	UP	DOWN
21 -	DOWN	UP	DOWN	UP	DOWN
22 -	UP	DOWN	DOWN	UP	DOWN
23 -	DOWN	DOWN	DOWN	UP	DOWN
24 -	UP	UP	UP	DOWN	DOWN
25 -	DOWN	UP	UP	DOWN	DOWN
26 -	UP	DOWN	UP	DOWN	DOWN
27 -	DOWN	DOWN	UP	DOWN	DOWN
28 -	UP	UP	DOWN	DOWN	DOWN
29 -	DOWN	UP	DOWN	DOWN	DOWN
30 -	UP	DOWN	DOWN	DOWN	DOWN
Listen Only -	DOWN	DOWN	DOWN	DOWN	DOWN

SW03

Set Size Drawing Standard

6	7	8	
UP	UP	UP	- ANSI Engineering
DOWN	UP	UP	- ANSI Engineering
UP	DOWN	UP	- ANSI Architectural
DOWN	DOWN	UP	- ANSI Architectural
UP	UP	DOWN	- ISO
DOWN	UP	DOWN	- ISO
UP	DOWN	DOWN	- ANSI Engineering
DOWN	DOWN	DOWN	- ANSI Engineering

SW04 - A

Speed Selection

10 Positions

1 = 10%
* *
9 = 90%
0 = 100% (Full Speed)

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

SW04 - B

Pen Pressure

10 Positions

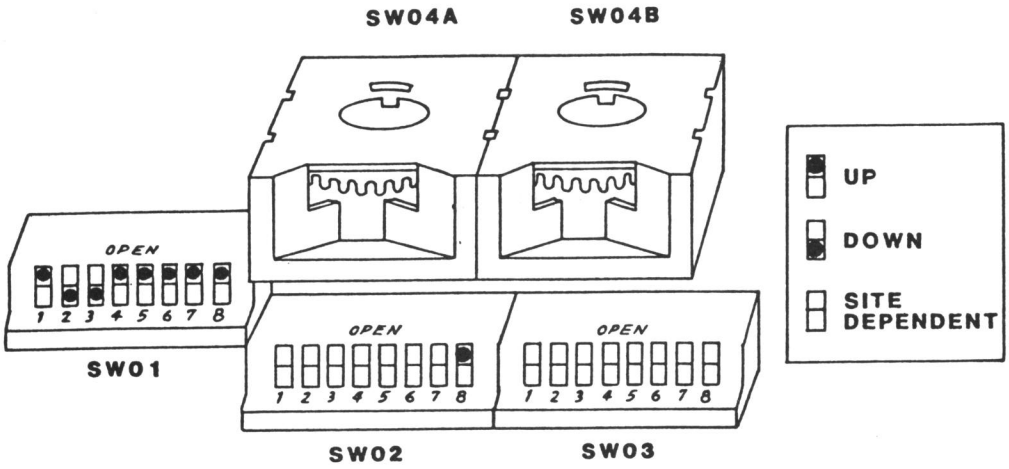
0 = Minimum
* *
9 = Maximum

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

MODE 5

NOT IMPLEMENTED

MODE 6
HPGL - RS-232-C



Mode 6 Switch Format

SW01

Mode Selection

1, 4 through 8 - UP
2 and 3 - DOWN

SW02

1 - Output Identification (OI) Command Response

DOWN - ZETA Plotter Model Number
UP - HP Model being Emulated

2 - Online/Offline Selection

DOWN - Online (Do not need <esc>.Y)
UP - Offline (Need <esc>.Y)

3 - Default Handshaking Protocol

DOWN - Software
UP - Hardwire

4 - "IN" Command Response

DOWN - Page Advanced
UP - No Page Advanced

SW02

5 - Plotter Style

DOWN - Act as HP7475A
UP - Act as HP7585

6 - UP - Not Used

7 - Plot Limits

DOWN - Simulated Mechanical (Hard)
UP - Clipping (Virtual)

8 - UP

SW03

Baud Rate

1	2	3	
UP	UP	UP	- 110
DOWN	UP	UP	- 300
UP	DOWN	UP	- 1200
DOWN	DOWN	UP	- 1800
UP	UP	DOWN	- 2400
DOWN	UP	DOWN	- 4800
UP	DOWN	DOWN	- 9600
DOWN	DOWN	DOWN	- 19200

Parity

4	5	
UP	UP	- None/Space (0)
DOWN	UP	- Even
UP	DOWN	- Odd
DOWN	DOWN	- None/Mark (1)

Automatic Repositioning/Set Size Drawing Standard

6	7	8	AUTO. REPOSITIONING	SET SIZE
UP	UP	UP	- ANSI Eng. - Large Pages	ANSI Eng.
DOWN	UP	UP	- ANSI Eng. - Small Pages	ANSI Eng.
UP	DOWN	UP	- ANSI Arch. - Large Pages	ANSI Arch.
DOWN	DOWN	UP	- ANSI Arch. - Small Pages	ANSI Arch.
UP	UP	DOWN	- ISO - Large Pages	ISO
DOWN	UP	DOWN	- ISO - Small Pages	ISO
UP	DOWN	DOWN	- No Repositioning	ANSI Eng.
DOWN	DOWN	DOWN	- Free-Form Repositioning	ANSI Eng.

SW04 - A

Speed Selection

10 Positions

1 = 10%
* *
9 = 90%
0 = 100% (Full Speed)

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

SW04 - B

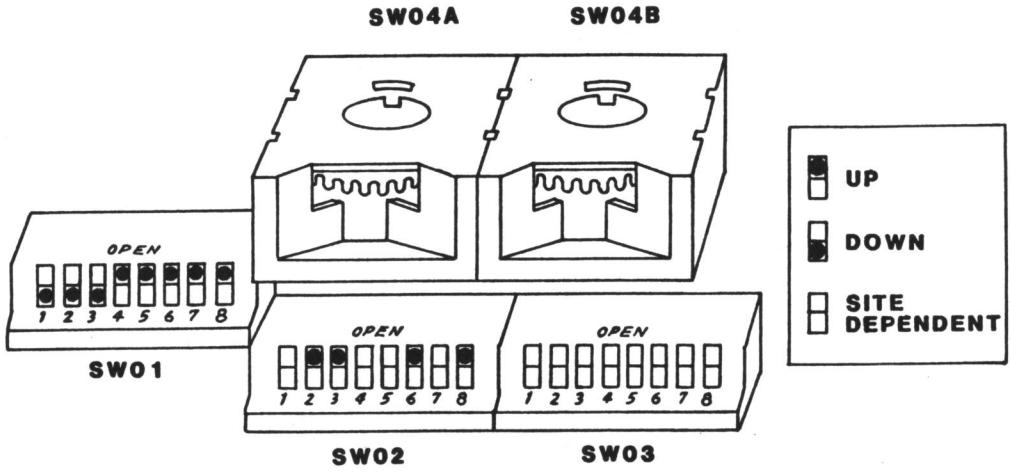
Pen Pressure

10 Positions

0 = Minimum
* *
9 = Maximum

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

MODE 7
HPGL - IEEE-488



Mode 7 Switch Format

SW01

Mode Selection

1, 2, 3 - DOWN
4 through 8 - UP

SW02

1 - Output Identification Command

DOWN - ZETA Plotter Model Number
UP - HP Model Being Emulated

2 and 3 - UP - Not Used

4 - "IN" Command Response

DOWN - Page Advanced
UP - No Page Advanced

5 - Plotter Style

DOWN - Act as HP7475A
UP - Act as HP7585

6 - UP - Not Used

SW02

7 - Plot Limits

DOWN - Simulated Mechanical (Hard)
UP - Clipping (Virtual)

8 - UP

SW03

Bus Address

		Switches 1	2	3	4	5
0	-	UP	UP	UP	UP	UP
1	-	DOWN	UP	UP	UP	UP
2	-	UP	DOWN	UP	UP	UP
3	-	DOWN	DOWN	UP	UP	UP
4	-	UP	UP	DOWN	UP	UP
5	-	DOWN	UP	DOWN	UP	UP
6	-	UP	DOWN	DOWN	UP	UP
7	-	DOWN	DOWN	DOWN	UP	UP
8	-	UP	UP	UP	DOWN	UP
9	-	DOWN	UP	UP	DOWN	UP
10	-	UP	DOWN	UP	DOWN	UP
11	-	DOWN	DOWN	UP	DOWN	UP
12	-	UP	UP	DOWN	DOWN	UP
13	-	DOWN	UP	DOWN	DOWN	UP
14	-	UP	DOWN	DOWN	DOWN	UP
15	-	DOWN	DOWN	DOWN	DOWN	UP
16	-	UP	UP	UP	UP	DOWN
17	-	DOWN	UP	UP	UP	DOWN
18	-	UP	DOWN	UP	UP	DOWN
19	-	DOWN	DOWN	UP	UP	DOWN
20	-	UP	UP	DOWN	UP	DOWN
21	-	DOWN	UP	DOWN	UP	DOWN
22	-	UP	DOWN	DOWN	UP	DOWN
23	-	DOWN	DOWN	DOWN	UP	DOWN
24	-	UP	UP	UP	DOWN	DOWN
25	-	DOWN	UP	UP	DOWN	DOWN
26	-	UP	DOWN	UP	DOWN	DOWN
27	-	DOWN	DOWN	UP	DOWN	DOWN
28	-	UP	UP	DOWN	DOWN	DOWN
29	-	DOWN	UP	DOWN	DOWN	DOWN
30	-	UP	DOWN	DOWN	DOWN	DOWN
Listen Only	-	DOWN	DOWN	DOWN	DOWN	DOWN

SW03

Automatic Repositioning/Set Size Drawing Standard

6	7	8	AUTO. REPOSITIONING	SET SIZE
UP	UP	UP	- ANSI Eng. - Large Pages	ANSI Eng.
DOWN	UP	UP	- ANSI Eng. - Small Pages	ANSI Eng.
UP	DOWN	UP	- ANSI Arch. - Large Pages	ANSI Arch.
DOWN	DOWN	UP	- ANSI Arch. - Small Pages	ANSI Arch.
UP	UP	DOWN	- ISO - Large Pages	ISO
DOWN	UP	DOWN	- ISO - Small Pages	ISO
UP	DOWN	DOWN	- No Repositioning	ANSI Eng.
DOWN	DOWN	DOWN	- Free-Form Repositioning	ANSI Eng.

SW04 - A

Speed Selection

10 Positions

1 = 10%
* *
9 = 90%
0 = 100% (Full Speed)

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

SW04 - B

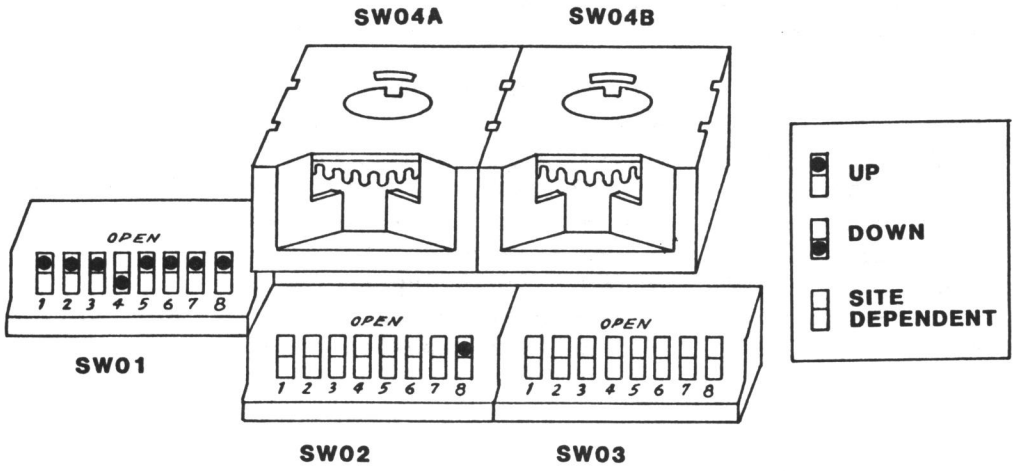
Pen Pressure

10 Positions

0 = Minimum
* *
9 = Maximum

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

MODE 8
TPE - RS-232-C



Mode 8 Switch Format

SW01

Mode Selection

1, 2, 3, 5 through 8 - UP
4 - DOWN

SW02

1 - Carriage Return Generates Line Feed

DOWN - CR = CR + LF
UP - CR = CR only

2 - Copy/Standard Mode Select

DOWN - Copy Mode
UP - Standard Mode

3 - Delete Key Select

DOWN - <ESC>? = <DEL> Key (Delete ignored)
UP - <DEL> Key = <DEL> key

4 - Handshaking Protocol

DOWN - XON/XOFF (software)
UP - None

SW02

Plotter Address

5	6	
UP	UP	- A
DOWN	UP	- B
UP	DOWN	- C
DOWN	DOWN	- D

7 - Plot Limits

DOWN - Simulated Mechanical (Hard)
UP - Clipping (Virtual)

8 - UP

SW03

Baud Rate

1	2	3	
UP	UP	UP	- 110
DOWN	UP	UP	- 300
UP	DOWN	UP	- 1200
DOWN	DOWN	UP	- 1800
UP	UP	DOWN	- 2400
DOWN	UP	DOWN	- 4800
UP	DOWN	DOWN	- 9600
DOWN	DOWN	DOWN	- 19200

Parity

4	5	
UP	UP	- None/Space (0)
DOWN	UP	- Even
UP	DOWN	- Odd
DOWN	DOWN	- None/Mark (1)

Automatic Repositioning/Set Size Drawing Standard

6	7	8	AUTO. REPOSITIONING	SET SIZE
UP	UP	UP	- ANSI Eng. - Large Pages	ANSI Eng.
DOWN	UP	UP	- ANSI Eng. - Small Pages	ANSI Eng.
UP	DOWN	UP	- ANSI Arch. - Large Pages	ANSI Arch.
DOWN	DOWN	UP	- ANSI Arch. - Small Pages	ANSI Arch.
UP	UP	DOWN	- ISO - Large Pages	ISO
DOWN	UP	DOWN	- ISO - Small Pages	ISO
UP	DOWN	DOWN	- No Repositioning	ANSI Eng.
DOWN	DOWN	DOWN	- Free-Form Repositioning	ANSI Eng.

SW04 - A

Speed Selection

10 Positions

1 = 10%
* *
9 = 90%
0 = 100% (Full Speed)

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

SW04 - B

Pen Pressure

10 Positions

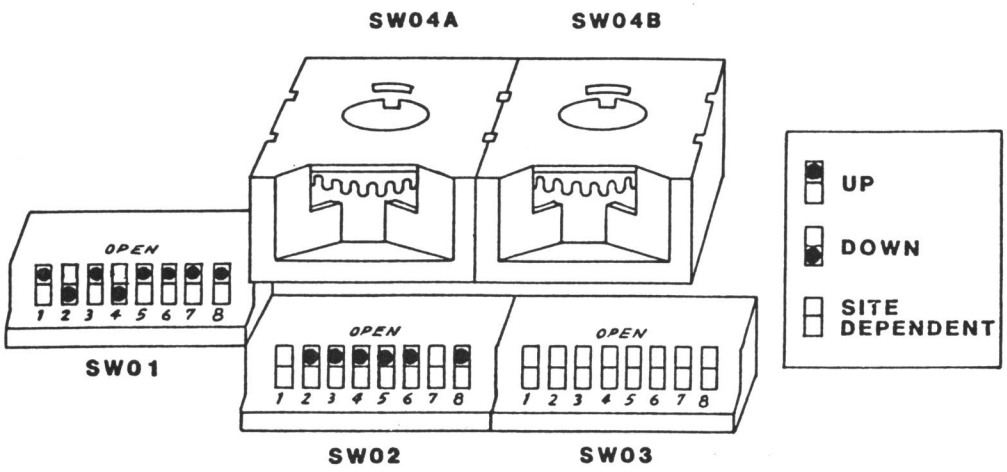
0 = Minimum
* *
9 = Maximum

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

MODE 9

NOT IMPLEMENTED

MODE 10
CCP-960 - RS-232-C



Mode 10 Switch Format

SW01 Mode Selection

1, 3, 5 through 8 - UP
2 and 4 - DOWN

SW02

1 - Handshaking Protocol

DOWN - XON/XOFF (software)
UP - RTS/CTS (hardwire)

2 through 6 - UP - Not Used

7 - Plot Limits

DOWN - Simulated Mechanical (Hard)
UP - Clipping (Virtual)

8 - UP

SW03

Baud Rate

1	2	3	
UP	UP	UP	- 110
DOWN	UP	UP	- 300
UP	DOWN	UP	- 1200
DOWN	DOWN	UP	- 1800
UP	UP	DOWN	- 2400
DOWN	UP	DOWN	- 4800
UP	DOWN	DOWN	- 9600
DOWN	DOWN	DOWN	- 19200

Parity

4	5	
UP	UP	- None/Space (0)
DOWN	UP	- Even
UP	DOWN	- Odd
DOWN	DOWN	- None/Mark (1)

Set Size Drawing Standard

6	7	8	
UP	UP	UP	- ANSI Engineering
DOWN	UP	UP	- ANSI Engineering
UP	DOWN	UP	- ANSI Architectural
DOWN	DOWN	UP	- ANSI Architectural
UP	UP	DOWN	- ISO
DOWN	UP	DOWN	- ISO
UP	DOWN	DOWN	- ANSI Engineering
DOWN	DOWN	DOWN	- ANSI Engineering

SW04 - A

Speed Selection

10 Positions

1 = 10%
* *
9 = 90%
0 = 100% (Full Speed)

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

SW04 - B

Pen Pressure

10 Positions

0 = Minimum
* *
9 = Maximum

(Refer to the Pen and Media Guide for specific settings for your pen and media combination.)

DEFINITIONS

The Option Switch functions, listed in alphabetical order with the modes they are applicable to, are:

Automatic Repositioning — Applicable to Modes 0, 1, 6, 7, and 8.

These 3 switches have a dual function in Continuous Roll Mode. When Set Size is being used the switches refer to Set Size Drawing Standard and are applicable to all modes. See definition for "Set Size Drawing Standard" for more details. When Set Size is not being used, the switches refer to Automatic Repositioning and are applicable to Modes 0, 1, 6, 7, and 8.

Automatic Repositioning advances plotting media in selected page size increments at the end or beginning of a plot file to prevent plots from overlapping. The determination of the end or beginning of a plot file is mode dependent. In GML, page repositioning occurs on receipt of a Soft Reset "70" command. In HPGL, page repositioning occurs on receipt of any of the page commands "PG", "AP", or "AH", or optionally under the initialize command "IN". In TPE, page repositioning is invoked by the Move to Home command <ESC> <FF>. Page sizes and their respective X-axis advance lengths are:

ANSI Engineering - Large Pages	17 inches
ANSI Engineering - Small Pages	8.5 inches
ANSI Architectural - Large Pages	18 inches
ANSI Architectural - Small Pages	9 inches
ISO - Large Pages	420 mm
ISO - Small Pages	210 mm

Additionally, through Automatic Repositioning you can select Free-Form Repositioning or No Repositioning.

Free-Form Repositioning finds the furthest plotted point on the X-axis and adds a three-inch margin. This is useful for continuous plotting of plot files with different page sizes.

No Repositioning starts a new plot at the ending pen position of the previous plot and leaves the Y-axis initial origin wherever the pen is placed on the page. This can be used for plot files that contain a media advance at the beginning of the new plot file or at the end of the previous plot file, or to allow for manual repositioning.

Baud Rate Applicable to Modes 0, 3, 6, 8 and 10.

These switches select the rate at which the plotter transmits and receives data. Baud rates from 110 to 19,200 are selectable on the ZETA 8, so that host protocol doesn't have to be changed in order to plot.

Bus Address Applicable to Modes 1, 4 and 7.

These switches determine the IEEE-488 bus address for the plotter. For HPGL users this is the HPIB (Hewlett Packard Interface Bus) address.

To set your bus address switches use a five-digit binary code. 0 = up and 1 = down. Numbers 1 through 30 select the IEEE-488 bus address your plotter transmits and receives on. Number 31 selects a listen only mode, in which the plotter can receive all information on the line regardless of address. The plotter can't transmit in the listen only mode.

Carriage Return Generates Line Feed Applicable to Modes 3, 4 and 8.

In printer emulation, the setting of this switch determines whether a carriage return <CR> plots a carriage return only, or a carriage return and line feed <CR> <LF>.

If the host and the plotter do not have compatible settings, double-spaced text or printing on top of previous lines will result.

Character Spacing Applicable to Modes 3 and 4.

In printer emulation this switch determines the spacing between characters.

Fixed Spacing is constant, so that the distance between the beginning of one character and the beginning of the next is always the same. The appearance is that of typewritten text.

The size of a character cell in Proportional Spacing is not constant, but depends on the size of the character. With Proportional Spacing a smoother, justified text is obtained.

Chord Angle Control - Applicable to Modes 0, 1, and 2

This switch controls the smoothness of curved characters, and the speed at which the plotter draws them. The option is useful if you are doing check plots and speed is more important than quality.

The function of the speed dial (SW04A) changes when this switch is on. If you set the dial at a high number (maximum = 0), the plotter will plot characters quickly but with angular curves (see figure). If you set the dial at a low number (minimum = 1), the plotter will plot characters slowly but with smooth curves (see figure). In short, speed and quality are inversely related; when one is high, the other is low. A setting of 6 on the speed dial will produce the same smoothness of characters as if the switch were turned off. A Character Chord Angle command in the file will take precedence over this switch. This means that if a Character Chord Angle command located in the file specifies a 20 degree chord angle, then the Chord Angle control switch will not be used.

Setting = 0 (fast speed)

Setting = 1 (slow speed)

Copy/Standard Mode Select Applicable to Mode 8.

This switch determines whether the plotter is in Copy Mode or Standard Mode, and whether the Plotter On sequence "<ESC><Address>E" is required.

Using Standard Mode requires the use of the Plotter On sequence "<ESC><Address>E".

For the Copy Mode, no Plotter On sequence is required, and any Tektronix plotter command will start the plotter.

Default Handshaking Protocol Applicable to Mode 6.

This switch is set to reflect whether default handshaking is software or hardwire generated. (Refer to Handshaking Protocol for further information.)

Use the Software setting for all modem and many direct line connections. Protocols can be XON/XOFF, ENQ/ACK or Polling. XON/XOFF and ENQ/ACK are set up using HPGL Device Control Instructions; Polling doesn't require any set-up.

Use the Hardwire setting only for direct line connections using CTS/RTS hardwire protocol.

Delete Key Select Applicable to Mode 8.

In Graph Mode ASCII decoding, all control characters are ignored with one exception. With LOY Byte a choice can be made between using the <DEL> key or using the sequence "<ESC>?" to indicate the <DEL> key. This sequence is used on some systems where the <DEL> key is used for special functions. For more information refer to the Tektronix Plotter Emulator Addendum.

Error Correct Mode Applicable to Mode 0.

Error Correct Mode is a special communications protocol that enhances communication between the host and the plotter. Through Error Correct Mode, communication line transmission errors can be corrected by retransmission of data blocks.

You have a choice between Non-Error Correct Mode or Error Correct Mode when transmitting and accepting data.

Non-Error Correct Mode spools data directly from the host to the plotter using the host's standard communications protocol, either XON/XOFF or RTS/CTS. This mode is recommended for on-line data sent directly to an on-site plotter.

Error Correct Mode employs a plotter response to verify correct transmission of data after each block of data has been sent by the host to the plotter. To verify the data the host generates a checksum on the data it sends and the plotter on the data it receives. The plotter compares the two checksums, and if they match the data block is plotted. If the checksums don't match, the data block is discarded and the host resends the same data block. This mode is recommended for data sent from remote environments over telephone lines where noise can cause faulty transmission.

Error Correct Mode (cont'd)

Problems occur when the plotter is set for Non-error Correct Mode and the host is set for Error Correct Mode. The host will send the first data block and then wait for the plotter to respond. No more data will be sent to the plotter, as the plotter isn't set to respond. Be sure both the host software and the plotter are in the same mode.

For more information on the Error Correct Mode see p 8-36.

Handshaking Protocol — Applicable to Modes 0, 3, 8 and 10.

These are two protocols used by the plotter and the host to prevent the overfilling of the plotter buffer during transmission.

XON/XOFF is a software generated handshake; CTS/RTS is a hardwire generated handshake.

When using the GML RS232-C mode/interface, Handshaking Protocol is used only when in the Non-Error Correct Mode.

"IN" Command Response — Applicable to Modes 6 and 7.

This switch can be set so that each initialize command ("IN") will signal a page advance. This is helpful for plot files without page advance commands. However, it is recommended that you use the No Page Advance setting first. This way you can see if your plot file has regular page advance commands, which tend to be more consistent with page endings than initialize commands.

Line Turnaround Delay — Applicable to Mode 0.

This switch is set only in combination with the Error Correct Mode. When using Line Turnaround Delay, the host slows down the transmission of data to the plotter. This delay is useful when your plotter is connected to a remote system and there is a high risk of transmission errors. Most computers don't require any Line Turnaround Delay. Line Turnaround Delay consists of two parts:

> Initial delay time, which is the delay required by a host computer after the final character of a message is transmitted and before it is ready to receive a response.
>
> Delay between characters, which is the delay between the first, second, and third characters.

The delay time for both is 225 ms. To set a different delay or set the initial and character delay separately, use the Terminal Monitor System (TMS) command `LTD'.

Mode Selection — Applicable to all modes.

These switches enable you to inform the plotter of the data format and interface you have selected. The ZETA 8 currently supports eight different modes. Some of these are print modes which print characters as they are received, as opposed to the plotter modes which interpret characters as graphic commands. Your host and plot files will determine which mode you select.

Interface, or connector ports activated:

RS-232-C: Activates the two 25 pin connectors labeled:

TO MODEM J102
TO TERMINAL J103

IEEE-488: Activates the one connector labeled:

TO IEEE-488 J104

Data format:

GML: Graphic Machine Language

HPGL: Hewlett-Packard Graphic Language Emulation

TPE: Tektronix Plotter Emulation

CC960: Cal-Comp Model 960 Emulation

Printer: Printer Emulation

Number of Characters/Line — Applicable to Modes 3 and 4.

In printer emulation this switch determines the number of characters per line. The choices are 80 characters per line or 132 characters per line.

On-line/Off-line Select — Applicable to Mode 6.

This switch sets up the host/plotter/terminal configuration through either an online or an offline setting.

Online is used when driving the plotter directly from the host without a terminal. The plotter will attempt to plot all data from the host. If a terminal is sharing the same host port, it will not be able to communicate directly with the host.

On-line/Off-line Select (cont'd)

Offline is used when a terminal and a plotter are sharing a host port and both devices are to be able to communicate with the host independently. The host will switch between the two devices using these escape sequences:

<esc>.Y or <esc>.(	(This activates the plotter and deactivates the terminal.)
<esc>.Z or <esc>.)	(This activates the terminal and deactivates the plotter.)

Output Identification Command Response Applicable to Modes 6 and 7.

This switch sets the response the plotter will send to the terminal when it receives the Output Identification "OI" command. The terminal will display either the ZETA plotter model number or the number of the HP model being emulated.

Parity Applicable to Modes 0, 3, 6, 8 and 10.

These switches determine whether the plotter I/O (Input/Output) will use a parity bit; if so, what type of parity; and if no parity is used, whether a "0" or a "1" will be used for the eighth bit after the seven bits of the ASCII character.

Choose between even, odd, or no parity. If there is no parity, choose between a space ("0") or a mark ("1"). The space is the most commonly used form of no parity, and the mark is used mainly by PRIME computers. If either even or odd parity is selected, you must modify the host protocol to use 7 data bits.

Pen Pressure Applicable to all modes.

This dial has ten settings: 0 through 9. Pen pressure increases in a linear fashion with the exception of settings 8 and 9 which increase at a slightly greater rate. To protect your pens, it is advisable to start from a lower setting and work up to the point where line quality is best. This dial becomes a fine tuner of pen pressure when using Parameter Mode Select, the Terminal Monitor System, the LIQUID INK control, or a host software command which designates the pen type, and thus the pressure.

Plot Limits Applicable to all modes.

This switch determines the behavior of the plotter when plot requests exceed the physical plotting area. A plot request exceeding the plotter limits will activate the LIMIT Indicator Light and plotting will continue. The LIMIT Indicator Light will remain lit until the plotter is reset or until PAUSE is pressed twice. A "Halt On Limits" can be implemented by using Parameter Mode Select.

Clipping, or a virtual limit, is the most common setting. It drops vectors located outside the physical plotting area.

Simulated Mechanical, or a hard limit, shifts vectors and plot origin if vectors fall outside the physical plotting area. This setting is used only to emulate older plotters which did not incorporate virtual plotting.

Plotter Address Applicable to Mode 8.

These switches enable you to send plots to different plotters. Each of four different plotters can be accessed by sending its respective plotter address: A, B, C, or D.

Plotter Style Applicable to Modes 6 and 7.

This switch allows you to modify the characteristics of HPGL accepted by your plotter. This allows you to use your plotter with almost any HP-compatible plotter software. Typically, drafting or CAD software requires the HP7585 setting, and business packages use the HP7475A setting.

Resolution Applicable to Modes 0 and 1.

These switches determine the length of the increments that the vectors from your plot file data will be drawn with. This feature enables you to adjust the size of GML plot files that were originally created for older plotters with differing resolution.

Set Size Drawing Standard Applicable to All Modes.

These 3 switches have a dual function in Continuous Roll Mode. When Set Size is being used the switches refer to Set Size Drawing Standard and are applicable to all modes. When Set Size is not being used, the switches refer to Automatic Repositioning and are applicable to Modes 0, 1, 2, 6, and 7. See definition for "Automatic Repositioning" for more details.

These switches determine which drawing size standard (ANSI Engineering, ANSI Architectural, or ISO) the Set Size function will use to interpret your choices of sizes for both your input plot file data and plot output. See Section 4 for a complete description of Set Size.

Speed Selection Applicable to all modes.

This dial has ten settings: 1 through 0. The speed increases, in a linear fashion, approximately ten percent with each digit increase. Speed can also be controlled by Parameter Mode Select, the Terminal Monitor System, or the LIQUID INK control. If more than one speed control is set, the one with the lowest speed setting will override any others.

SRQ Buffer Control Applicable to Modes 1 and 4.

SRQ is an abbreviation for Service Request. When set for SRQ, the plotter will request more data from the host computer whenever the plotter buffer is less than half full. Some computer systems (mainly those with multiple peripherals connected to the IEEE-488 bus) will require this feature. Check with your systems programmer to find out if that is the case with your system.

This new firmware release also supports the use of Parallel Polling for buffer control. The plotter will respond positively to a Parallel Poll from the host computer whenever its buffer is less than half full. This feature is not switch-selectable; it is always enabled.

Text Line Position Applicable to Modes 3 and 4.

In printer emulation this switch determines the orientation of a line of text. The text can be plotted parallel to either the X- or Y-axis.

ERROR CORRECT

A ZETA plotter configured for Mode 0: GML-RS-232-C accepts data in one of two modes, Error Correct or Non-Error Correct. The two modes were developed to meet different communications environments and are very useful when used correctly.

In Non-Error Correct Mode, a continuous stream of data is transmitted from the host to the plotter using the host's standard communications protocol. The choices are XON/XOFF or RTS/CTS. This mode is recommended for locally connected plotters.

In Error Correct Mode, data is transmitted from the host to the plotter in fixed-size blocks. Each block of data is followed by a sequence of characters used to verify the correct transmission of the data. The host generates a checksum on the data it sends and the plotter generates a checksum on the data it receives. The plotter then compares the two checksums. If they match, the data block is plotted and the plotter sends an affirmative response back to the host. If the checksums don't match, the data block is discarded, the plotter sends a negative response, and the host resends the same data block. This mode is recommended for data sent from remote environments over telephone lines where noise can cause faulty transmission. It is also used when a host computer can't support either XON/XOFF or RTS/CTS protocol.

Problems will occur when the modes of the plotter and the host are mismatched. If the host is set for Error Correct Mode and the plotter is set for Non-Error Correct Mode, only the first block of data will be plotted because the host will send the first data block and then wait for the plotter to respond. The plotter is not set up to respond, so after plotting the first block of data, both the plotter and the host will be waiting for data from the other. There is also a possibility that the host end-of-block sequence of characters will cause the plotter to plot incorrectly or display an error condition before stopping.

In the opposite case, where the plotter is set for Error Correct Mode and the host is set for Non-Error Correct Mode, no plotting will occur. In Error Correct Mode, the plotter won't plot until it receives and verifies a complete block, which includes the host end-of-block sequence of characters. The host will not send the end-of-block sequence in Non-Error Correct Mode, so the plotter won't plot. Also, depending on the plotter model and the number of characters in the file, various error conditions may occur.

Error correction is set on the plotter by an Option Switch. The mode of the host computer is controlled by the use of FPS subroutines PLOTS and UTIL53. Be sure your host and plotter are in the same mode.

Using Error Correct Mode

The following steps should be used for Error Correct Mode:

1. Your cable configuration should be from terminal, to plotter, to modem.

2. Select Error Correct on Option Switches (SW02 - 4). You may need to adjust the line turnaround delay Option Switch (SW02 - 5).

3. Turn on your peripherals (modem, plotter, etc.).

4. Press CLEAR on your plotter.

5. Use the front control panel to move your pen carriage to the desired starting position.

6. Connect your modem to the remote host (dial it up).

7. Make sure the host software is set for Error Correct.

Your terminal will function as though it were connected directly to the modem. Once the log-on procedure is completed, most communication between the terminal and remote host will not be interfered with by the plotter. However, if the plot enable sequence (10 Z's) is transmitted from the remote host, the plotter will stop sending data to the terminal. The 10 Z's indicate an input block has been received successfully and plotting will begin.

When the plotter has received the last block of a plot, it will restore communications to the terminal. The plotter may continue to plot for some time while depleting the buffered data. However, you are able to use the host system, start another plot file, or log off.

If an error is detected in any input block:

1. The ERROR Indicator Light will begin blinking.

2. Simultaneously, the block will be re-requested.

3. The ERROR Indicator Light will turn off when the block has been received correctly.

Note that block requesting usually goes on simultaneously with plotting because the plotter has a 2048 character buffer.

Terminating a Plot in Progress in Error Correct

If you desire to terminate a plot in progress, do either of the following:

1. Press CLEAR on the plotter. (The data stream from the host will be seen on the terminal.)

2. Type a high priority interrupt (usually BREAK) on your terminal, and then press CLEAR on the plotter.

OR

1. Press PAUSE.

2. Press NEXT PLOT.

3. Press PAUSE.

When using the second method there may be a delay before the next plot begins. The delay is due to the need to complete transmission of the current plot from the host. If the plot is long, it is usually preferable to press CLEAR and abort the program as described above.

Modem/Terminal Communication with Plotting Disabled

If you would like to communicate between the terminal and the modem without plotting, turn the plotter's power switch off. The plotter will still transmit data, but plotter interference will be eliminated.

Data Block Size

One of four RAM (internal memory) data block configurations must be selected when using the Error Correct Mode. The plotter controller has 2048 bytes of RAM dedicated to communication buffering. The selections are two 1024-byte buffers, two 768-byte buffers, four 512-byte buffers, or eight 256-byte buffers. Use the FPS subroutine ZETOBS to select the appropriate buffer configuration.

After you have pressed CLEAR, the plotter controller waits to receive an error-free block of data. After it has accepted a data block, it will only receive a block of data the same size as the initial one. The plotter controller will continue to use the same buffer size until you press CLEAR or reset the plotter (power off and on).

Data Block Size (cont'd)

The following considerations are important in determining the block size for a remote host system:

1. Frequency Of Errors--If errors occur frequently, it is better to receive data in small blocks. This way, less data will have to be transmitted again due to faulty data blocks.

2. Line Turnaround Time--To increase the speed of transmission and plotting, it is better to receive data in large blocks. With fewer blocks, the host computer will not stop transmission to generate checksums as often.

Most errors are caused by transient conditions within the telephone switching network. You will have fewer errors if you request dedicated or conditioned lines from the local telephone company. If you use normal voice grade (unconditioned) lines on the Dial Network, you can expect more errors. Errors tend to occur in bursts, and some connections will have a much greater rate than others. If your call is on a bad line, you should consider replacing the call. Notify the telephone company and/or the host computer operations office if you consistently have trouble making a good connection.

Plotting will begin as good blocks of data are received. The plotter's full buffers allow plotting to begin while the controller is requesting and filling the unfilled buffers. Bad data blocks are commonly detected and corrected via retransmission, while the plotter continues uninterrupted.

Auto-Start

Press CLEAR whenever you use a new host computer or a new block size. This is required because each remote computer transmits prompt character(s) and non-printing characters between write and read commands. The plotter controller then determines the block size and number of between-block characters. This plotter controller ability is referred to as Auto-Start. Auto-Start reads the host computer requirements and the block size, and expects this information to remain constant until cleared.

Recording in Error Correct

The error correction utility in the plotter can be used to record error-free data from a remote host. Recording in Error Correct is done as follows:

1. Attach the plotter to the host computer or modem through the "TO MODEM" port on the plotter.

2. Attach an ASCII terminal and the recording device to the plotter. There are three ways to connect these devices:

   (a) USE ONLY IF YOUR TERMINAL HAS TWO RS-232-C PORTS. Connect the terminal to the plotter through the "TO TERMINAL" port on the plotter. Connect the recording device to the terminal through the second RS-232-C port on the terminal. Be sure that your terminal has talk-through capabilities between its ports.

   (b) USE ONLY IF YOUR RECORDING DEVICE HAS TWO RS-232-C PORTS. Connect the recording device to the plotter through the "TO TERMINAL" plotter port. Connect the terminal to the recording device through the second RS-232-C port on the recording device. Be sure that your recording device has talk-through capabilities between its ports.

   (c) USE ONLY IF YOU HAVE A Y-CABLE. Attach both the terminal and the recording device to the plotter's "TO TERMINAL" port using a y-cable.

3. Using the TMS function on the terminal, turn Plot off (PLO off) and Terminal Print to 1 (PRI 1).

4. Turn on the recording device to the RECORD setting.

5. Instruct the host, by means of the terminal, to send data to the plotter.

6. When your host notifies you of the end of transmission, repeat step 5 to record another plot file. Otherwise, turn off the recording device.

Non-Error Correct Mode

Non-Error Correct Mode allows the plotter controller to stop and start the data stream by line toggling CTS/RTS or by sending XON/XOFF characters. The type of toggling is determined by an Option Switch (SW02 - 5).

The plotter can be used with or without a terminal. Without a terminal, the plotter is connected to the host modem port. The plotter connection is at the terminal port. When the plotter controller is ready to accept data, both the CTS and DSR lines will be high. When the controller buffer is near full, the CTS and DSR lines will be lowered. This signals the source to stop transmitting data. When the CTS and DSR lines return high, the data stream will resume exactly where it left off.

With a terminal connected to the plotter's terminal port, the plotter should be connected to the host's terminal port. The connection at the plotter is to the modem port. RTS and DTR lines are used to control the data flow. The terminal functions normally with the host except when plotting. While plotting, data flow from the host to terminal ceases or continues depending on an Option Switch.

For more information on Error Correct and Non-Error Correct Modes consult the FPS and GML user guides.

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